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HAWAII AGRICULTURAL EXPERIMENT STATION
HONOLULU, HAWAII
Under the supervision of the
UNITED STATES DEPARTMENT OF AGRICULTURE

BULLETIN No. 60

UTILIZATION AND COMPOSITION OF ORIENTAL VEGETABLES IN HAWAII

BY

H. L. CHUNG, Agronomist
and
J. C. RIPPERTON, Chemist

Issued December, 1929

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H. L. CHUNG, *Agronomist*, and J. C. RIPPERTON, *Chemist*[1]

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Emigrants from the Orient to the Hawaiian Islands in 1852 and later brought with them many of the plants characteristic of their native lands. As a result, a collection of vegetables which are largely indigenous to the Orient has been gradually accumulated in Hawaii, where they are considered unique botanically and valuable dietetically. These vegetables are now grown extensively in Hawaii, but they are not as well known to the local cosmopolitan population as they should be. The purpose of this bulletin is to make the vegetables better known in order that they may be more generally utilized to aid in varying the dietary.

Most of the vegetables discussed in this bulletin are of Asiatic origin, coming chiefly from China, India, Japan, Chosen, and Persia. Some have long been established in China and Japan, where they were introduced centuries ago.

CLASSIFICATION OF VEGETABLES

For the sake of convenience the vegetables have been arranged alphabetically in three groups: (1) Varieties the leaves and stems of which are the principal parts used; (2) varieties that are raised for their fruits and pods; and (3) varieties that are raised primarily for their roots or underground portions.

[1] The writers gratefully acknowledge their indebtedness to Shao Chang Lee, professor of the Chinese language, University of Hawaii, for helpful suggestions and for verification of the Chinese names and characters; to T. Shimizu, agriculturist, for identification of the vegetables, and to G. Kawahara, seedsman, for furnishing the Japanese names and characters; to F. H. B. Brown, botanist of the Bishop Museum, for confirming the botanical names; to Mrs. Shao Chang Lee and Miss Lillian Moo for the Chinese recipes; and to the Japanese Committee of the International Institute of Honolulu for the Japanese recipes.

GROUP 1. LEAFY AND STEM VEGETABLES

BAMBOO SHOOTS (*Bambusa* spp.). (Fig. 1[2])

Chinese name: Choke-sun[3]
Japanese name: Take-noko

Shape: Young, undeveloped stout or slender cone-shaped shoot, with clasping scales; base, enlarged; top, pointed.
Size: Two to five inches in diameter at base; 8 to 16 inches long.
Color: Exterior, straw yellow to buff near base, and light green with traces of purple from middle to tip; interior, white.

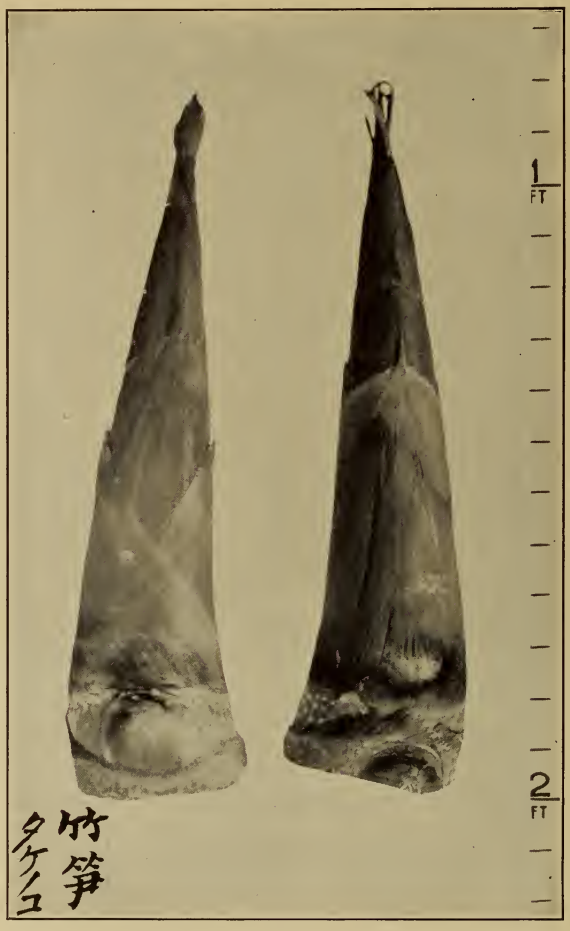

FIGURE 1.—Bamboo shoots

The bamboo shoot is the immature stalk of any of the several species of the larger bamboos (*1, p. 28; 13, p. 98; 14, p. 234*).[4] It is severed from the clump or mother plant when 8 to 16 inches tall.

[2] The name of the vegetable in Japanese (left) and Chinese (right) is given in each illustration in the lower left-hand corner.
[3] The Chinese names throughout have been Romanized in the Cantonese dialect.
[4] Reference is made by italic numbers in parentheses to "Literature cited," p. 63.

The succulent shoot is sheathed with alternating clasping scales. The core within the scales is the edible part of the shoot. The bamboo plant from which the shoots are derived grows 10 to 36 feet high, and each culm measures 3 to 6 inches in diameter. The plant is a native of China and Japan.

The young shoots are found in season on the local market, where they are kept partly submerged in fresh water to retain their crispness.

Bamboo shoot is a favorite ingredient in many of the dishes of the people of the Far East. Bamboo shoot is also used as one of the ingredients in the well-known Japanese dish, sukiyaki. After the scaly leaves are removed, the tender core of the shoot is cut in small slices for use in flavoring soups and for frying with bean sprouts, or with Chinese preserving melon or edible-podded peas.

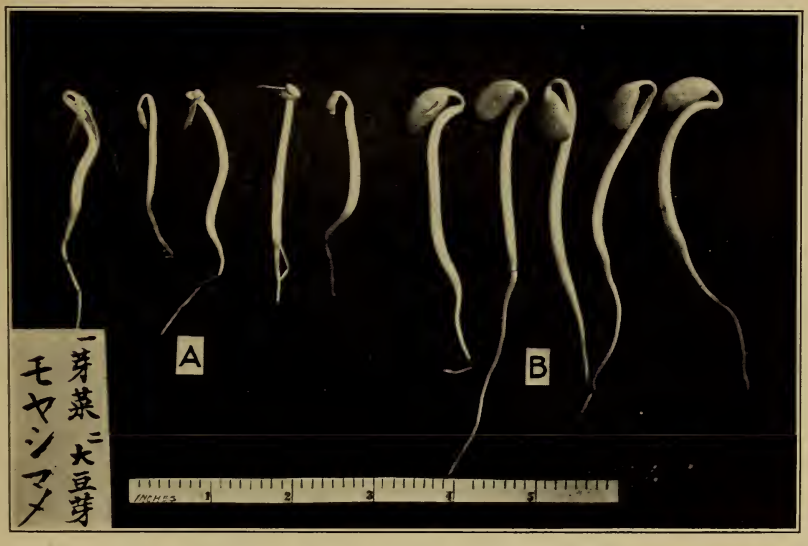

FIGURE 2.—Bean sprouts: A, Small variety; B, large variety

LARGE OR SOYBEAN SPROUTS (*Glycine hispida*). (Fig. 2B)

Chinese name: Dai-tau-nga

Shape: Succulent shoots which grow from freshly germinated seeds having two large yellow cotyledons and a long, narrow taproot.

Size: Stem and root 3 to 3½ inches long, one-eighth inch thick; cotyledons five-eighths inch long and five-sixteenths inch in diameter.

Color: Stem and root, white; cotyledons, yellow.

The soybean plant is a hairy, bushy annual, and its native home is China and Japan (*3, p. 403*).

The large bean sprouts are prepared daily for the vegetable market in Honolulu. The sprouts are obtained by germinating the soybean. The period of germination is from four to six days. The beans are washed, submerged in water in a container for 24 hours, and then drained. A damp cloth, sack or grass-woven mat is placed over the container. A fresh supply of water is added to the container at

6-hour intervals during the 24-hour period to prevent the beans from heating. In the market the sprouts are kept submerged in water so that they may retain their crispness and succulency.

To serve the sprouts with meat.—Wash about 6 ounces of large bean sprouts well; drain. Slice thinly 6 ounces of pork or lean beef and mix with 1 teaspoon cornstarch, 1 tablespoon soy sauce, and season with black pepper and with salt to taste. Put in heated pot 1 tablespoon peanut oil and one-fifth teaspoon chopped garlic. Place meat in pot and stir until brown. Then add bean sprouts and about six 1-inch lengths of green onions. Stir again, adding meantime one-fourth cup water to make gravy. Cook 12 minutes. Serve hot.

Small or Mungo Bean Sprouts (*Phaseolus aureus*). (Fig. 2A)

Chinese name: Nga-choi
Japanese name: Moyashi-mame

Shape: Shoots grown from freshly germinated small mungo bean. Stem of shoot slender; root, short and narrow; cotyledons, narrow and long with or without plumules.
Size: One and one-half inches long; one-twelfth inch thick.
Color: Root and stem, white; cotyledons, light yellow.

The bean is a native of India.

Small bean sprouts are to be found regularly on the market. They are prepared for the table like the large bean sprouts but should be boiled only three minutes. Chinese vermicelli, or zen-se, is sometimes used with small bean sprouts. Preparatory to being used, the vermicelli should be soaked in cold water for about an hour. It will then be soft enough to cut in 3-inch lengths with a pair of scissors. Boil the vermicelli in salted water for 15 or 20 minutes to make tender and then mix it with the bean sprouts.

Butterbur (*Petasites japonica*). (Fig. 3)

Chinese name: Foon-dung
Japanese name: Fuki

Leaf: Round or cordate; lower surface, white and woolly; upper surface, green and smooth; breadth, 8 to 12 inches.
Petiole: Very succulent, green to light pink; 12 to 36 inches long.

The plant is a coarse perennial herb with creeping rootstocks and very broad leaves (*1, p. 14; 3, p. 783; 5, p. 850; 9, p. 363*). The edible part of the butterbur is the petiole. The local supply is mostly from the island of Hawaii where conditions near the fern forest are ideal for the crop. The leaves are partly trimmed for market, and the plant is sold in bunches of 6 to 10 stalks or petioles.

To prepare for the table.—Boil the butterbur for five minutes. Peel, cut in 2-inch lengths, and add to 1½ cups of soup stock. Add one-third cup soy sauce and 1 tablespoon sugar. Cook for 15 minutes over a slow fire. Serve hot.

CELERY (*Apium graveolens*)

Chinese name: Hon-kun
Japanese name: Oranda-mitsuba

Leaf: Pinnate, ovate to oblong, cleft, in two or three pairs.
Petiole: Erect, branching, loose, 10 to 12 inches long, grooved.
Color: Green to dark green (unblanched).
Odor: Strong smelling.

Celery is a glabrous herbaceous biennial and is indigenous to Asia and Europe (*3, p. 565*). The celery generally grown in the Hawaiian

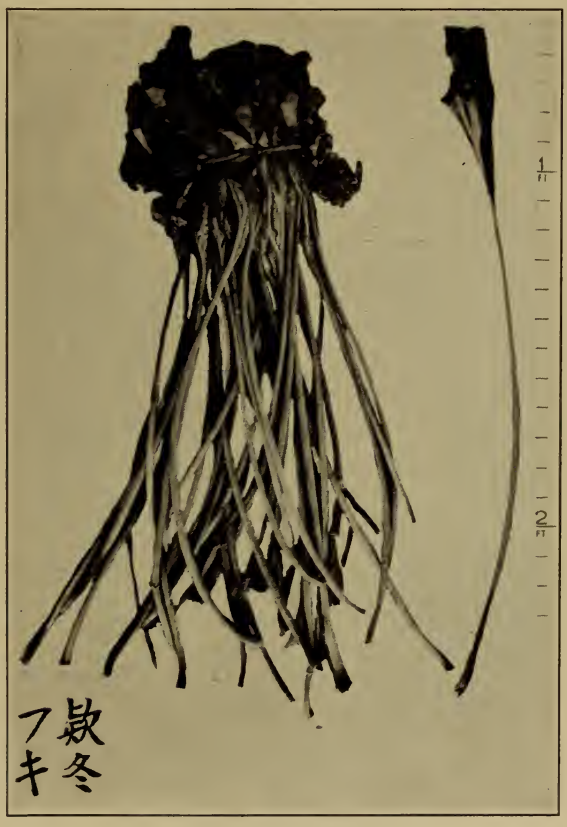

FIGURE 3.—Butterbur

Islands is small and appears on the markets in individual green leafstalks, which are tied in small bunches. The locally grown celery is used extensively by people from the Far East because of the attractive green color and distinctive flavor.

FIGURE 4.—Chinese cabbage: A, Heading variety; B, nonheading variety

CHINESE CABBAGE (*Brassica pe-tsai, B. pekinensis*). (Fig. 4)[5]

Chinese name: Wong-nga-bak
Japanese name: Shanto-na

Shape: Oblong, compact or loose, depending upon the variety.
Leaves: Numerous, radical; crêpelike, clasping or loose; 8 to 10 inches long; 3 to 8 inches broad; somewhat hairy, thin and veined; margin on edges rather indistinctly toothed; midrib broad, flat, and smooth.
Color: Outer part, light to yellowish green; inner part, yellowish to white, depending upon solidity of head.

Chinese cabbage is a native of Asia (*4, p. 27*). Chinese cabbage is probably the best known of the oriental vegetables in Europe and North America. During the past 30 years it has attracted the attention of American seedsmen by its commercial possibilities. Now practically all the larger seed houses of Europe and the United States list the cabbage as "pe-tsai," "wong bok," "celery lettuce," or "white mustard." Twelve or more varieties of Chinese cabbage are grown locally. These may be divided into two types. One type is characterized by its conspicuous compact, blanched head, whereas the other type makes loose or nonheading growth. Both types, however, produce short and tall forms. Heading varieties invariably become nonheading when they are grown under unfavorable conditions. In Hawaii the Chinese cabbage is an all-season vegetable. It makes its best growth, however, in the cool, moist regions and during the cool months. Fine specimens are produced in the vicinity of Hilo from January to May.

To prepare Chinese cabbage soup.—Slice thinly 1 pound lean pork and mix with 1 teaspoon cornstarch and 1 teaspoon soy sauce. Season with pepper. Wash 1 tablespoon of dried small shelled shrimp and the cabbage well. Cut the cabbage in 1-inch or 2-inch lengths. Put in heated pot 1½ teaspoons of peanut oil, 1 small slice ginger, 1 teaspoon salt. Add the pork mixture and the shrimp and fry for a minute. Add 1½ quarts of water and boil for 15 minutes. Add the cabbage and cook until it is tender.

CHINESE SPINACH (*Amaranthus gangeticus*). (Fig. 5)

Chinese name: Yin-choi
Japanese name: Hiu (Hiyu)

Leaf: Oval, or ovate, abruptly tapering at the tip, depending upon the variety; green; 1½ to 2 inches long; 1 to 1½ inches broad.
Petiole: Green, 1 to 2½ inches long; not thick.
Stem: Four and one-half to six inches long; one-fourth to three-sixteenths inches in diameter; smooth.

The plant is indigenous to Asia. Its original home is probably in India. Chinese spinach is not related to the true spinach (*Spinacia oleracea*). The name is local and was suggested by its resemblance to the true spinach when cooked. Another variety of Chinese spinach conforming to that described above has a white stem and petiole in-

[5] The term "cabbage" as used in this bulletin is a misnomer so far as its relation to true cabbage (*Brassica oleracea*) is concerned. Orient-grown leafy and stem vegetables are so-called "cabbages" probably because of the early interpretation of the Chinese word "choi," which means cabbage or greens.

FIGURE 5.—Chinese spinach

FIGURE 6.—Chives

stead of the usual green. Although only recently introduced for development by the station the variety is already in local demand.

Chinese spinach is sold on the market in the seedling stage in rather large cylindrical bunches about 6 to 12 inches across. The individual plants are 4 to 12 inches long.

To prepare for the table.—Wash thoroughly 1 bunch Chinese spinach. Remove the roots and cut the leaves in 2-inch lengths. Put in a heated pot 1½ teaspoons peanut oil, a little garlic, and 1 teaspoon salt; add the vegetable. Stir for one-half minute, then add one-half cup water and cook for 15 minutes. Serve hot.

Chives (*Allium schœnoprasum*). (Fig. 6)

Chinese name: Kui-choi
Japanese name: Nira

Leaf: Slender, cylindrical, hollow, and flattened at the tip; 6 to 8 inches long; one-fourth inch wide.
Color: Green to dark green, with or without white bulbous base.
Odor: Onionlike, mild.

Chives is a hardy herbaceous perennial which grows in a thick mass resembling a tuft of grass (*5, p 287*). It is indigenous to Europe and Asia. Chives is packed for the local market in bunches about 6 to 12 inches long and 4 inches wide. It is used in flavoring the numerous mixed vegetable dishes so common among the people of the Orient.

Coriander (*Coriandrum sativum*). (Fig. 7)

Chinese name: Yuen-sai
Japanese name: Koyendoro

Leaf: Pinnately or ternately decompound, broadly ovate with margins deeply incised; 1 inch long; three-fourths inch wide; upper surface dull dark green; lower surface, light green, very glossy, and smooth.
Petiole: Short, 2 to 2¾ inches long, with upper surface grooved.
Stem: Round, smooth.

The plant is a glabrous annual, and its home is in southern Europe. The tender seedlings 3 to 6 inches long are used for the table. They are packed in bunches of 24 or more. Coriander is an all-season crop and is used for seasoning and for garnishing.

Dandelion (*Taraxacum officinale*). (Fig. 8)

Chinese name: Pu-kung-ying
Japanese name: Tampopo (Tanpopo)

Leaf: Basal, 3 to 9 inches long; lance shaped; deeply and irregularly lobed and toothed with divisions pointed toward the base; young leaves partly hairy; light to dark green.
Petiole: Short and margined.

The dandelion, although considered a weed, is an excellent salad and potherb and is used by the people of both the Occident and the Orient. Several varieties of dandelion have been perfected for use in place of the common variety.

For market from 6 to 12 young plants are packed in small bunches with or without the large, broad, deep-yellow flowered heads.

FIGURE 7.—Coriander

FIGURE 8.—Dandelion

GARLAND CHRYSANTHEMUM (*Chrysanthemum coronarium*). (Fig. 9)

Chinese name: Tung-ho-choi
Japanese name: Shin-giku

Leaf: Cleft into many parts or multified; margins incised and closely placed; 3 to 5 inches long; 1½ to 2 inches broad; smooth and light green.
Petiole: Green, flat.
Odor: Characteristic of chrysanthemums.

The plant is a herbaceous annual and is a native of the Mediterranean regions. Two varieties are cultivated in Hawaii—one with narrow but finely divided leaves and the other with broader leaves not so conspicuously divided. The former is known in Japanese as chu-ba-shun-giku, and the latter as oba shun-giku.

FIGURE 9.—Garland chrysanthemum

Garland chrysanthemum is the young seedling stage of *Chrysanthemum coronarium* and is packed in bunches about 8 inches long, 4 inches wide, and 2 inches thick. Older plants exceeding 12 inches are as a rule very fibrous and coarse and unfit for table use. The plants when permitted to grow to maturity may attain a height of 2 to 3½ feet and bear bright yellow flowers resembling miniature chrysanthemums.

To prepare for the table.—Wash well 1 bunch of garland chrysanthemum. Remove the roots and cut the tops in 2-inch lengths. Put in a heated pot 2 teaspoons peanut oil, 1 teaspoon salt, and one-half cup water. When water begins to boil add the vegetable and cook until it is tender. Season and serve hot.

GINGER BRACTS (*Zingiber mioga*). (Fig. 10)

Chinese name: Keong-fa
Japanese name: Mioga

Shape: Conical, consisting of close-fitting bracts; tip tapering with or without flowering buds.
Size: Two and one-half to four inches long; 1¼ to 1½ inches in diameter.
Color: Lower peduncle, white; upper, reddish purple; bracts, dark purple; flowers, yellow or buff.
Odor: Slightly pungent; gingerlike.

The plant is said to be a native of Japan (*9, p. 99*). It is only sparingly cultivated in Hawaii because the demand for it is limited.

FIGURE 10.—Ginger bracts

It appears on the market infrequently and is used chiefly for flavoring soups.

GREEN ONION (*Allium fistulosum*). (Fig. 11A)

Chinese name: Chang-chung
Japanese name: Negi

Shape: Stout, somewhat tufted.
Leaf: Green, smooth, cylindrical, hollow, pointed at tip; 12 to 14 inches long.
Neck: White, smooth, one-half inch in diameter; 4 to 5 inches in length, or one-fourth as long as the plant.
Base: Slightly swollen, with many fibrous roots.
Odor: Pronounced.

The plant is indigenous to Asia.

Green onions are sold in neat bunches of 10 to 14, and the leaves are tied in two places. In Hawaii the vegetable vendor usually

gives two or three green onions free of charge to each purchaser of other vegetables. The green onion is practically indispensable in the cookery of the people from the Far East.

FIGURE 11.—A, Green onion; B, leek

HONEWORT (*Cryptotænia canadensis*). (Fig. 12)

Chinese name: Asp-ye-kan
Japanese name: Mitsuba

Leaf: Trifoliate, ovate; upper surface, dark green; lower surface, glossy light green; margin of leaf finely dentated, with points turning upward; 2½ to 3½ inches long; 1¾ to 2½ inches broad.
Petiole: Cylindrical, hollow, light green to yellowish green; 5 to 7 inches long.
Odor: Scented.

The plant is a smooth, hardy annual and grows readily from seeds. It makes its best growth in a cool, moist soil. Its cultivation on the island of Oahu is limited largely to the Pauloa, Manoa, and Palolo Valleys.

Honewort in general appearance somewhat resembles green celery. Honewort is sold on the market in bunches about 12 inches long, 10 inches wide, and 4 inches thick. Each bunch contains 8 to 12 plants.

Honewort is used primarily as a condiment for soup, but it may also be boiled alone for a minute, then cooled, cut in 3-inch lengths, and served with soy sauce.

FIGURE 12.—Honewort

KALE (*Brassica oleracea acephala*). (Fig. 13)
Chinese name: Kai-lan-choi

Leaf: Dull or glossy green, thick and fleshy, thinly covered with bloom on both sides; ovate or oblong in shape; 4 to 6 inches long; 2 to 3½ inches broad.
Petiole: Cylindrical, slender; 2 to 2½ inches long; one-eighth to three-sixteenths inch in diameter; covered with white bloom.
Flower: Yellow or white, depending upon the variety.

The plant is indigenous to Europe. Kale for market is tied in bunches about 6 inches long, 4 to 5 inches wide, and 2 inches thick. The flowers or buds may or may not be present.

To serve plain.—Select the very tender parts of 1 bunch of kale and wash thoroughly in several waters. Cut the kale in 2-inch lengths. Put 2 teaspoons peanut oil, 1 teaspoon salt, 1 slice ginger in a heated pot; then add the kale and fry for one-half minute.

Add one-half cup water and cook until kale is tender. Then add 1 teaspoon sugar to the liquid to form gravy. Serve.

To serve with fish.—Prepare 1 bunch kale as directed above. Wash and slice one-half pound fish finely. Put in heated pot 1½ teaspoons peanut oil, 1 slice ginger and one-half teaspoon salt. Add the fish; stir the whole vigorously for one-half minute; then add the kale and one-half cup of water. Cook 3 minutes over a hot fire. Serve.

Leaf-Mustard Cabbage (*Brassica juncea*). (Fig. 14)

Chinese name: Kai-choi
Japanese name: Oh-garashi

Leaf: Crêpelike or crumpled surface; oval to broad and oblong to obvate in shape; margin, notched; 6 to 12 inches long and 4 to 8 inches broad.
Petiole: Swollen, curved or straight, depending upon the strain or variety, and usually white bloom on surface.

Leaf-mustard cabbage or "green mustard," and "Chinese mustard," as it is sometimes called, is a hardy annual. It normally grows 3 to 4 feet high and branches profusely. The flowers are bright yellow, and the seeds are small, round, and reddish brown to black (*8, v. 1, p. 157*). The plant is a native of China and India.

Leaf-mustard cabbage appears on the market in two forms, one as very young seedlings, and the other as fairly well-developed but immature plants. The former are sold in bunches of 10 or more, and the latter in bunches of 4 to 6. Two distinct varieties of the vegetable can be had, one with enlarged, curved basal petioles, and the other with straight petioles.

To prepare soup.—Slice finely 1 pound lean pork and stir into 1 teaspoon cornstarch and 1 teaspoon soy sauce. Pepper to season. Wash 1 bunch leaf-mustard cabbage and 1 tablespoon dried small shelled shrimp. Cut the cabbage in 2-inch lengths. Put in heated pot 1½ teaspoons peanut oil, 1 slice ginger, and one-half teaspoon salt. Add the pork mixture and the shrimp and fry for a minute. Then add 1½ quarts of water and boil for about 15 minutes. Add cabbage and cook for 5 minutes. Serve.

Leek (*Alliunt porrum*). (Fig. 11B)

Chinese name: Dai-chung
Japanese name: O-negi

Leaf: Green, not hollow, flattened and keeled, smooth; 12 to 24 inches long; 1 inch broad.
Neck: White; 6 to 12 inches long, or half as long as the plant; one-half to 1¼ inches in diameter.
Base: Not swollen.

The plant is a native of Europe and western Asia.

Several varieties of green Alliums appear daily on the market. The leek is usually the largest of the varieties, and can readily be identified by its long, white neck and narrow base.

FIGURE 13.—Kale

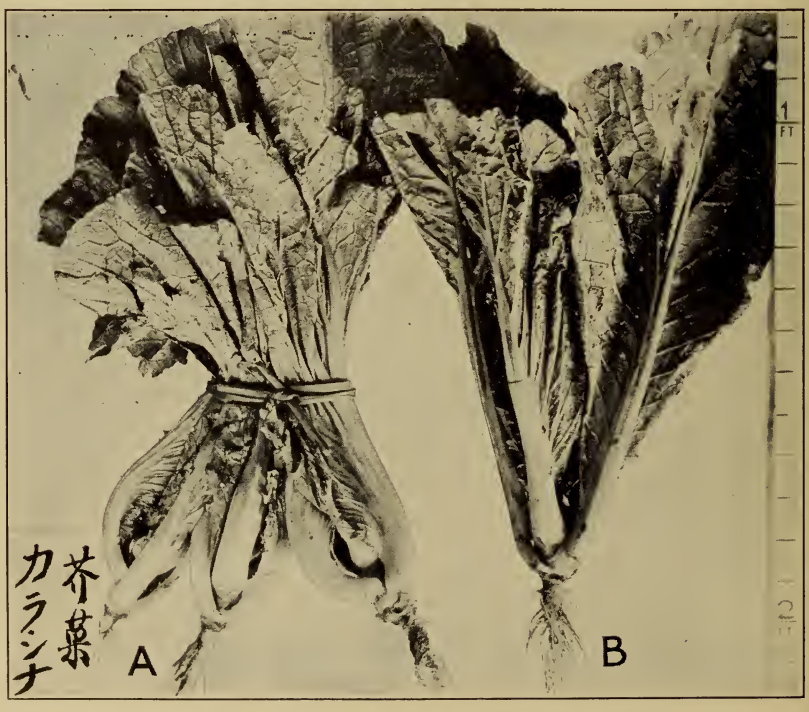

FIGURE 14.—Leaf or green mustard; A, Enlarged, curved basal variety; B, straight basal variety

Lettuce (*Lactuca sativa*)

Chinese name: Sung-choi
Japanese name: Chisa

Head: Loose, not compact.
Leaf: Crisp, crumpled; 8 to 10 inches long; 6 to 8 inches wide.
Color: Light yellowish green.

Lettuce is a native of India and southern Europe. People from the far eastern countries prefer a loosely formed head. The variety known as Black Seeded Simpson is grown especially for them by the truck gardeners in Hawaii. Lettuce is marketed in bunches of two to four plants.

To prepare for the table.—Wash each leaf of 1 bunch of lettuce separately and thoroughly. Shake them free of water. Put 1 teaspoon peanut oil, 1 slice ginger, and ½ teaspoon salt in a pot over the fire. When the mixture is very hot add ½ cup water, and then the lettuce. Cook for five minutes. Serve hot.

Malabar Nightshade (*Basella rubra*). (Fig. 15)

Chinese name: Pu-tin-choi
Japanese name: Tsuru-murasaki

Leaf: Green, glossy, smooth, and tender; oval to circular with apex notched or emarginated; 3 to 5 inches long; 2 to 4 inches wide.
Petiole: Five-eighths to three-quarters inch in diameter; smooth and tender; green or purple, depending upon the variety.

Malabar nightshade is a native of Asia. The plant is either a twining annual or a biennial which branches freely (*14, p. 303*). The variety in common use is green. Another variety has green leaves and red or purplish petioles and stems.

Malabar nightshade is tied in bunches about 12 inches long or longer, depending upon the length of the vine, 6 inches wide, and 2 inches thick.

To prepare for soup.—Wash 1 bunch Malabar nightshade thoroughly and cut it in 3-inch lengths. Mix 1 pound sliced lean beef or pork with 1 teaspoon cornstarch and a little soy sauce. Season with pepper. Put in heated pot 1½ teaspoons peanut oil and ½ teaspoon salt; add the meat and fry for ½ minute. Add 1½ quarts of water, boil 15 minutes, and then add the vegetable. Cook for another 15 minutes. Serve. When pork is used, 1 heaping tablespoon of dried small shelled shrimps may be added.

To serve with bean curd.—Wash 2 heaping tablespoons dried, small shelled shrimp thoroughly; boil 15 minutes in 1½ quarts of water to which ½ tablespoon salt has been added. Add four 2-inch cubes of bean curd, or tau-hu, to the soup.[6] Boil five minutes, add the vegetable, and cook until it is tender.

[6] Bean curd is the fresh coagulated milk that is obtained from pulverized soybeans after straining and cooking them.

MATRIMONY-VINE (*Lycium chinense*). (Fig. 16)

Chinese name: Kau-kei
Japanese name: Kuko

Leaf: Smooth, dark or bright green; ovate to lanceolate; 1 to 1½ inches long; one-half to 1 inch wide.
Petiole: One-fourth to one-half inch long.
Stem: Coarse, angled, yellowish gray, with single spine at each node.

Matrimony-vine is a native of eastern Asia. The plant has prostrate branches, is spiny, and grows 3 to 6 feet high. The flowers are crêpelike, purplish, and produce small orange-colored berries.

FIGURE 15.—Malabar nightshade

The leaves constitute the edible portion of the vegetable. Matrimony-vine is found periodically on the market in bunches about 20 inches long and 6 inches wide.

To prepare for soup.—Wash 1 bunch matrimony vine thoroughly by dipping it vigorously in running water, then carefully strip each leaf from the thorny stems. Mix ½ pound finely sliced lean pork with 1 teaspoon cornstarch and a little soy sauce. Season with pepper. Wash 2 tablespoons dried, small shelled shrimp and boil 10 minutes in 1½ quarts of water and add the pork mixture to the shrimp, then add the vegetable and 1 partly beaten egg. Boil until the leaves are tender. Season with salt and serve.

MUGWORT (*Artemisia vulgaris*). (Fig. 17)

Chinese name: Ngaai
Japanese name: Yomogi

Leaf: Dissected into lanceolate lobes; 1 to 3½ inches long; margin, smooth on older or terminal leaves. The young leaves of the seedlings are cleft—that is, the leaf division is less pronounced. Upper surface, silvery gray with fine and close-pressed wool.
Petiole: Very short, or may be absent from older branches; 2 to 3 inches long on the new, succulent branches.
Stem: Purplish or purplish gray, smooth, much branched; 1 to 1½ feet long.
Odor: Fragrant.

FIGURE 16.—Matrimony-vine

The mugwort is a hardy herbaceous perennial (*5, p. 849*) and is a native of Europe. It grows to a height of 2 to 3 feet. The seedling or all the branches collectively from the mature plant are sold in bunches about 12 to 18 inches long.

This vegetable is used principally for flavoring and coloring festival rice cakes, or mochi. To cook with rice, select young leaves and tender twigs of the plant; wash them well; boil in a little water until they are tender. Then steam with rice. When the vegetable-rice mixture is thoroughly cooked, place it in a mortar and mash.

Then form the mass into balls and fill the center of each with an, a mixture of sugar and beans.[7]

PERILLA (*Perilla frutescens*). (Fig. 18)

Chinese name: Che-so
Japanese name: Shiso

Leaf: Crisp; wrinkled; hairy; ovate; base, wedge shaped; 1½ to 1¾ inches long; three-fourths to 1 inch wide; margin or edge, wavy, serrated, or incised; upper surface has bronze-purplish green luster; lower surface, dark purple.

FIGURE 17.—Mugwort

Petiole: Long, slender, slightly hairy; one-half to 1 inch long.
Stem: Long, slender, purple.
Flower: May or may not be present, white to rose colored.
Odor: Balsamic scented.

Perilla, also known as *P. frutescens crispa* and *P. frutescens nankinensis*, is indigenous to Burma, China, Japan, and India (*3, p. 646*). It is sold in small bunches of 10 to 15 plants, or branches 3 to 24 inches long, depending upon the age of the plant. The smaller size, with luxuriant foliage, is usually the seedling stage of growth.

[7] To make an, soak 1 pound adzuki beans (*Phaseolus chrysanthos*) 24 hours. Drain, add fresh water sufficient to cover, and let come to a boil. Drain again, and add more fresh water and let come to a boil, repeating this process four times to remove any bitter taste from the beans. After the final draining, mash the beans. Then add to them sufficient water to permit washing out and removal of the finer particles when strained through the cheesecloth. Add sugar to the strained mass and cook slowly until it has the consistency of mashed potatoes.

To serve cucumber flavored with perilla.—Peel one medium-sized cucumber; cut in half lengthwise, remove the seeds, and then slice thinly; add salt and let stand for about five minutes. Then wash the cucumber, squeeze dry, and put in bowl. Shred the perilla. Cut the contents of one-half can of small fresh shrimps in half lengthwise; then mix with the cucumber and the perilla, with 3 tablespoons Japanese vinegar, 1 tablespoon soy sauce, and 1 teaspoon sugar. Serve.

FIGURE 18.—Perilla

POTHERB-MUSTARD CABBAGE (*Sinapis chinensis*). (Fig. 19)

Chinese name: Sui-choi
Japanese name: Midsuna

Leaf: Oblong or oblong ovate, with deeply cut lobes on the sides of the midribs; margin or edge of leaf incised or irregular; 4 to 6 inches long; 1 to 2½ inches broad; green and smooth.
Petiole: Six to eight inches long; slender; one-eighth to three-eighths inch broad; white and smooth; upper surface, flat; round at lower surface.

The plant is a biennial but ordinarily is grown as an annual (*4, p. 28; 1, p. 10*). Its original home is Asia. Potherb-mustard cabbage is one of the few Orient-grown vegetables which can be readily

distinguished from others by its deeply-cut leaves and long, slender petioles. The plant also produces many axillary buds at the base of each petiole when developed. As the plant grows older these buds send out long, white petioled leaves, which make it appear large and showy.

Potherb-mustard cabbage is sold on the market and used by the Japanese exclusively as a seedling. It is packed in bunches about 6 inches wide, 4 to 6 inches long, and about 2 inches thick. The vegetable has a pleasant flavor and should be more extensively used. The tender plants should be selected for table use. They should be washed thoroughly and prepared as directed for leaf-mustard cabbage.

Radish Greens (*Raphanus sativus longipinnatus*)

Chinese name: Loh-bak-choi-chai
Japanese name: Ko-ko-no-ka daikon

Leaf: Compound, with leaflets arranged in pairs on each side of the petiole; smooth, free from spines; 4 to 6 inches long; 2 to 3 inches broad; margin or edge, scalloped (*8, v. 1, p. 166*).
Root: White; 4 to 6 inches long; three-sixteenths to three-eighths inch in diameter.

Radish greens, seedlings or thinnings obtained as a by-product from the culture of the radish, are removed at intervals from the seed beds to make room for such growing plants as are to be retained for the production of the edible root. The culture of radish greens or daikon on a large scale calls for heavy initial seedings to assure a good stand. The seedlings are sold as ko-ko-no-ka daikon. They are cooked like the Chinese spinach.

Radish greens is conspicuous on the market by reason of the long, white taproots, and it is tied in small bundles of 20 or more seedlings.

Spinach (*Spinacia oleracea*). (Fig. 20)

Chinese name: Boh-choi
Japanese name: Horenso

Leaf: Narrow oblong or ovate oblong, with projecting lobes on either side; green, smooth; 3 to 5 inches long; 1 to 1½ inches wide.
Petiole: Slender; 4 to 4¼ inches long; brittle.
Crown: Large, with many developed axillary buds.

Spinach is a native of Persia. Boh-choi might be freely translated "an edible greens from the country of Persia." Spinach is a delicious greens for the cool season. It usually appears on the local markets from November to February. Spinach is in demand by the people of both the Orient and the Occident and is a rich source of iron in the dietary.

Because of its brittle nature spinach is sometimes wrapped for market in a leaf of lily or canna and tied securely with fiber. This prevents the breaking of the petioles in handling. Other vegetables which resemble true spinach are not so wrapped for market. Each bunch contains 4 to 6 plants and is about 12 inches long and 4 inches broad.

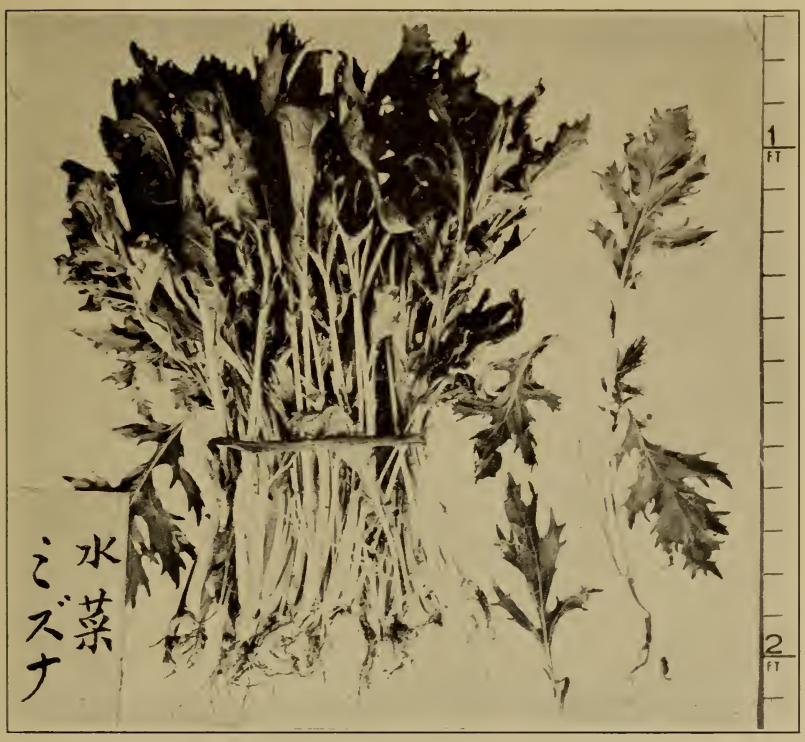

FIGURE 19.—Potherb-mustard cabbage

FIGURE 20.—Spinach

To prepare for the table.—Cut off at the crown; separate the leaves and wash thoroughly. Cut them in 3-inch lengths and cook in water to which a little salt has been added. Boil for 10 minutes; then remove from the fire; drain, and serve with or without butter.

SWAMP CABBAGE (*Ipomœa reptans*). (Fig. 21)

Chinese name: Ung-choi

Leaf: Light green, thin, smooth, ovate-cordate, or arrowhead shaped; 2½ to 4 inches long; 1½ to 2½ inches across (*1½ p. 291*).

Petiole: Light yellowish green, smooth with hollow internodes; one-fourth to one-half inch in diameter. White, tender roots are often present around the nodes of the lower stem.

FIGURE 21.—Swamp cabbage

Swamp cabbage is a member of the morning-glory family and is said by Hillebrand (*7, p. 314*) to have been brought to Hawaii by early Chinese immigrants. The plant is an aquatic herbaceous creeping or floating vine. It thrives in ponds, and bears a white flower which is similar in shape to the sweetpotato bloom and the morning-glory, but is slightly smaller. Swamp cabbage is a native of India.

Swamp cabbage for market is packed in bunches of 16 or more terminal shoots of vines. Each vine is about 12 to 14 inches long. The bunches are tied at the lower end and are fan shaped in appearance.

To prepare for the table.—Wash well the tender part of 1 bunch of swamp cabbage; cut in 3-inch lengths. Have at hand a heated pot containing 1½ teaspoons of peanut oil and a small piece of crushed garlic. Add cabbage and fry briskly five minutes. Season with salt or soy sauce before serving.

Swiss Chard (*Beta vulgaris cicla*). (Fig. 22)

Chinese name: Tim-choi
Japanese name: To-jisa

Figure 22.—Swiss chard

Leaf: Ovate to oblong in shape; light to dark green in color; smooth, fleshy, thick, and broad; 6 to 8 inches long; 3 to 6 inches broad.
Petiole: Light green to light pink; 4 to 8 inches long.
Midrib: Large and conspicuous.

Swiss chard or leaf beet is a member of the common beet family, but develops large fleshy leaves instead of the root. The plant is a herbaceous biennial and grows 1 to 3 feet high. The leaves are gathered periodically and can be removed without injuring the plant. It is a native of Europe, northern Africa, and Asia.

Swiss chard is usually marketed in bunches with its leaves placed alternately in opposite directions, which gives the bunch the appearance of a dumb-bell.

To prepare for the table.—Wash each leaf and petiole and cut them in 3-inch lengths. Prepare as directed for Chinese spinach. Use very little water so as not to spoil the flavor.

Taro Shoots (*Colocasia esculenta*). (Fig. 23)

Chinese name: Woo-sun
Japanese name: Imo-no-me

Size: Eight to eighteen inches long; three-fourths to 1 inch in diameter.
Shape: Semierect or curved.
Color: White or white with purple tinge.

Figure 23.—Taro shoots

The taro plant, also known as asparagus taro-top (*7*, *p. 455*), is indigenous to Asia and Polynesia. Within recent years the culture of taro or dasheen for the production of shoots has been placed on a commercial basis (*15*). The demand for this vegetable in Hawaii will probably increase as it becomes better known.

Taro shoots are the tender, delicious growth from the taro corm which is grown in moist sandy soil, or in sphagnum moss in a darkened place. The vegetable is sold on the market in cylindrical bunches of 8 to 18, depending upon their size.

To prepare for the table.—Wash the vegetable and cut it in 2-inch lengths; boil in water to which a little salt has been added. Cook till tender and serve with or without butter.

FIGURE 24.—Taro stalks

TARO STALKS (*Colocasia esculenta*). (Fig. 24)

Chinese name: Woo-harp
Japanese name: Imo-kuki

Shape: Long, slender, wide at base, narrow at tip.
Size: Twelve to sixteen inches long; three-fourths to 1 inch in diameter at base.
Color: Light green to dark purple or purplish green, depending upon the variety.

Taro stalks are the leafstalks of many varieties of both the wet and the dry land taro. The stalks may be green or purple or a combination of the two colors. The stalks consist of the upper four-fifths of the entire leafstalk of the taro. The lower fifth is left attached to the corm when the latter is offered for sale as taro. Taro

stalks come in cylindrical bundles about 12 to 15 inches long and 4 inches across. The stalks are practically leafless, but some young unfurled leaves are to be found within the sheaths. The Japanese dry-land varieties, Tru-no-ko, Aka-do, and Miyako, are largely used in supplying the local markets. The variety which is known on the market as Tow-imo is 4 to 6 feet long and 2 to 4 inches thick at the base. It is light green and may or may not be covered with a bloom or whitish substance. This variety is cultivated primarily for its edible petioles.

To prepare for the table.—Cook as directed for taro shoots but until tender.

FIGURE 25.—Tender fern fronds

TENDER FERN FRONDS (*Pteridium aquilinum*). (Fig. 25)

Chinese name: Kuet
Japanese name: Warabi

Shape: Stafflike petiole or leafstalk with closely coiled tip.
Size: Eighteen to twenty-four inches long; tapering toward tip; three-fourths to 1¼ inches in diameter at thick end.
Color: Light green with fine, close-pressed brown wool over entire stem and leaves.

Tender fern fronds are the immature, unfurled leaves and leafstalks of the tree fern. The fronds for market are tied in bunches of four to six. A smaller species of fern (*Osmunda regalis japonica*

or var. *biformis*), known as Zenmai in Japanese, is used like the tender tree fronds. Neither species is cultivated. Both are gathered in the mountains by gardeners whose truck farms are adjacent to fern forests.

To prepare for the table.—Remove skin from four stalks; cut in 3-inch lengths and then lengthwise into thirds. Place in water over night to remove acid and prevent discoloration. Boil them in water for seven minutes; drain; fry in one-half tablespoon peanut oil or lard; add 2 tablespoons soup stock, 1 tablespoon sugar, and a little soy sauce; cook again for five minutes and serve.

Turnip Greens (*Brassica rapa*)

Chinese name: Mu-ching-choi-chai
Japanese name: Ko-ko-no-ka kubura

Leaf: Radical, pinnate; 8 to 12 pairs; soft, slightly prickled; narrow; 5 to 6 inches long.
Root: Flat, or globular; white; 1 to 1½ inches in diameter, depending upon age.

Like the radish greens turnip greens are the leafy tops which are obtained by thinning the stand of plants. Like radish greens also, turnip greens appear on the market in bunches, but may be distinguished from the former by their round or flattened white roots. They are cooked like the Chinese spinach.

Water Cress (*Nasturtium officinale*). (Fig. 26)

Chinese name: Sai-yong-choi
Japanese name: Kawara-chisa

Leaf: Odd pinnate; leaflets round or oblong; 2 to 8 pairs; 1 to 1¼ inches long; three-fourths inch wide; smooth, yellowish, or dark green.
Stem: Long; one-fourth to three-eighths inch in diameter; smooth, light green.
Flowers: Rarely appear at stage when the cress is gathered for market. Flowers are small and white.

Water cress is a floating perennial and grows best in fresh, running water. On the island of Oahu it is frequently observed growing in ponds adjacent to springs or artesian wells. Its native home is Europe.

Water cress is sold in bunches about 16 to 20 inches long, tied near the cut base. This vegetable appears on the market throughout the year.

To prepare for the table.—Wash 1 bunch water cress well; break the tender part in 2-inch lengths. Slice finely one-half pound lean pork. Put in heated pot 1 teaspoon peanut oil, 1 slice ginger, and one-half teaspoon salt. Add the pork and fry for 2 minutes; then add 1 quart water and 6 jujubes or hong-cho. Boil over a slow fire for one hour. Then add the water cress and boil for another 20 minutes before serving.

WATER DROPWORT (*Œnanthe stolonifera*). (Fig. 27)

Chinese name: Sui-kan
Japanese name: Seri

Leaf: Green, 2 or 3 leaflets; three-fourths to 1½ inches long; one-half to three-fourths inch wide; margin or edge of leaflet scalloped.
Petiole: One to one and three-fourths inches long; slender, hollow.
Stem: Hollow, 6 to 10 inches long; light green.

FIGURE 26.—Water cress

The plant is an aquatic herbaceous perennial with stolons which are readily propagated (*8, v. 2, p. 696*).

Water dropwort somewhat resembles the young celery plant but has a fibrous root system. Water dropwort is tied in bunches about 12 inches long and 5 to 6 inches wide. The entire plant, including the root system, is marketed.

As a flavoring for soups.—Place the vegetable in boiling water for one minute. Cool in water, then cut it in 2-inch lengths and add to chicken or fish soup. Use about seven pieces of water dropwort to each portion of soup.

White-Mustard Cabbage (*Brassica chinensis*). (Fig. 28)

Chinese name: Bak-choi
Japanese name: Shirona

Head: Loose, not compact.
Leaf: Smooth and green; broadly obovate and entire, glossy, firm, scallop edged; 6 to 8 inches long; 4 to 6 inches broad.
Petiole: Fleshy, glossy, white; 4 to 7 inches long; one-half to 1½ inches wide.

Of all the Orient-grown vegetables, white-mustard cabbage is perhaps the best known by people of the Occident. The plant is a general favorite because of the pleasing taste of its petioles and its attractive appearance. White-mustard cabbage is a native of Asia.

Figure 27.—Water dropwort

Four forms of white-mustard cabbage are found on the market. The first, a flowering variety known as bak-choi-sum, is slender and has long, round, narrow petioles and narrow leaves and tops which bear buds or yellow blossoms in profusion. The second form, the Japanese variety known as shakushina on the market, is tall and has long, slender, white petioles and oval leaves. The third form is stout and has luxuriant leaves and fleshy petioles but no flower buds or blossoms. The fourth form, known as bak-choi-chai, is the seedling stage of the three above-mentioned forms and is the result of thinning the plants.

To make white-mustard cabbage soup, prepare like leaf-mustard cabbage.

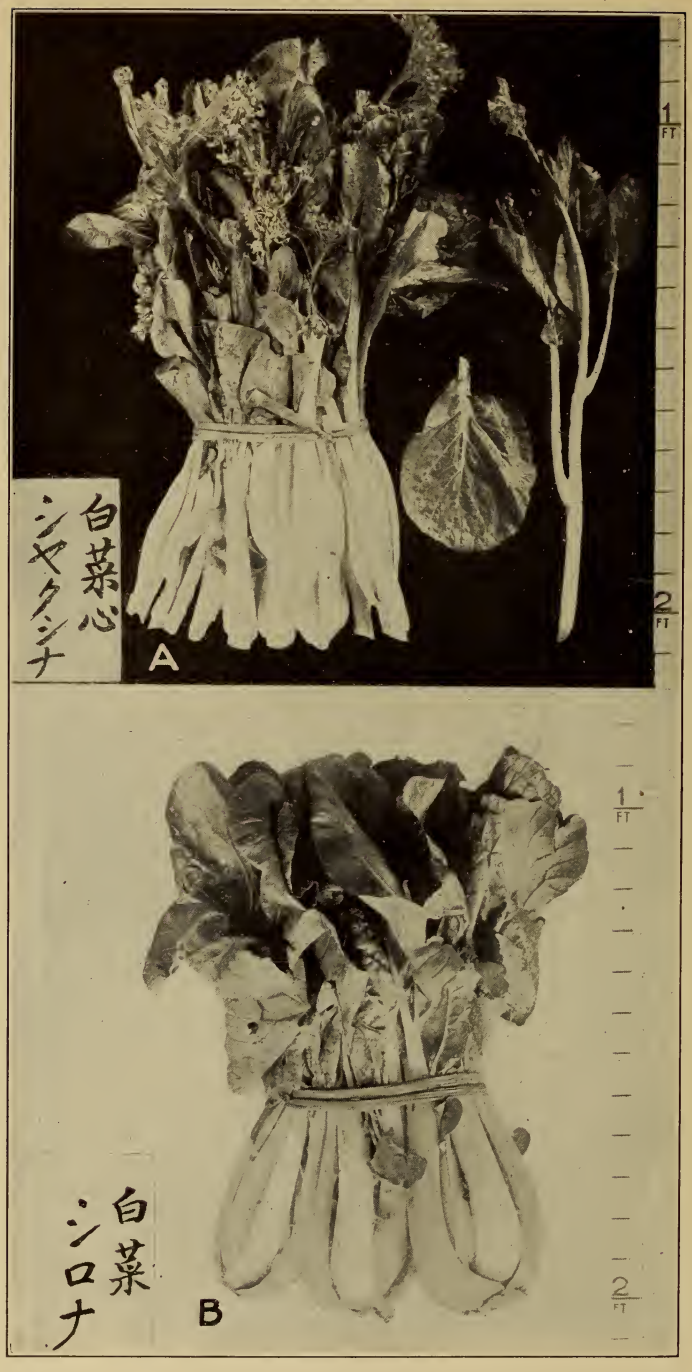

FIGURE 28.—White-mustard cabbage: A, A slender, early-flowering variety; B, stout variety

To serve plain.—Wash 1 bunch white-mustard cabbage well and cut it in 1-inch or 2-inch lengths. Put in heated pot 2 teaspoons peanut oil, 1 slice ginger, one-half tablespoon salt; add the vegetable and fry for one-half minute. Add one-half cup water and cook until the vegetable is tender.

To cook with meat.—Mix one-half pound finely sliced lean beef or pork with 1 teaspoon cornstarch, a little pepper, and 1 teaspoon soy sauce. Put in heated pot 2 teaspoons peanut oil, one-fifth teaspoon garlic, and one-half teaspoon salt. Add the meat, stir, and fry to light brown. Then add the vegetable and one-half cup water. Cook until the vegetable is tender. Season to taste and serve.

GROUP 2. FRUIT AND POD VEGETABLES

Balsam-Pear (*Momordica charantia*). (Fig. 29)

Chinese name: Fu-qua
Japanese name: Tsuru-reishi

Shape: Long, oblong, oval, many-ribbed, and covered with blunt warts or tubercles; tapering at apex; smooth throughout.
Size: Six to twelve inches long; 2 to 2½ inches in diameter.
Color: Light to dark green.
Taste: Bitter.

Balsam-pear, also known as bitter melon, is an annual plant which grows eight to twelve feet long. In some of the oriental gardens in Hawaii it appears as a dense matlike covering of green foliage grown in long, vertical rows with newspaper envelopes attached here and there. The envelopes are used to protect the young melons from the attacks of the melon flies.

The balsam-pear is picked for the market before maturing. The fruit, however, is at its best when it is beginning to ripen. The interior of the melon is pithy and has many flat seeds in pulplike coverings. The seeds are white to brown, with a peculiar pattern on the surface, depending on the degree of ripeness. The rind is bright yellow to orange, and the pulplike seed covering becomes bright red at maturity.

To prepare for chop suey.—Slice two medium-sized balsam-pears lengthwise and remove pulp and seeds. Wash pears and cut in ⅛-inch slices; then place them in boiling water for five minutes; drain. Slice thinly one-half pound lean beef and mix with 1 teaspoon flour or cornstarch. Put in heated pot or frying pan 1½ teaspoons peanut oil, a little salt, some soy sauce, and 1 slice ginger. Add the meat and fry for about one minute; then remove from the container. Fry the boiled vegetable separately for another minute, then mix with the cooked beef, adding enough water to make gravy. Cook one-half minute and serve.

To stuff.—Cut two large balsam-pears crosswise in 2-inch lengths; remove pulp and seeds with handle of spoon and wash. Run one-half pound finely chopped lean pork through meat grinder. Wash 2 teaspoons small, dried, shelled shrimps and run through grinder. Mix shrimps and pork and again run through grinder. Soak three soda crackers in cold water, then mix them with a little

salt, pepper, soy sauce, and finely cut onion or chives. Chop fine and add to meat mixture. Stuff the balsam-pear sections with the meat mixture. Brown both ends of the stuffed pear in a frying pan containing 1½ teaspoons peanut oil. Remove from pan and place in a saucepan with enough water to make gravy. Sprinkle a little salt on the meat and allow it to cook for about 15 minutes before serving.

Sweet pepper, eggplant, or bean curd may be used in place of the bitter melon.

FIGURE 29.—Balsam-pear

COWPEAS (*Vigna sinensis*). (Fig. 30)

Chinese name: Sai dau-kok
Japanese name: Sasage

Shape: Pods, slightly curved.
Size: Six to nine inches long; one-fourth inch in diameter.
Color: Light yellow, green, or green blotched with purple.

The cowpea is a native of Asia. It appears on the local market in the green-pod stage and is usually used as a vegetable without shelling. The pods are marketed in small bundles of 12 to 18. The slightly immature cowpea pods are prepared for the table like the yard-long bean.

CHINESE PRESERVING MELON (*Benincasa cerifera*). (Fig. 31)

Chinese name: Dung-kwa
Japanese name: Togwa

Shape: Spherical to long-oblong.
Size: One to four feet long; 10 to 16 inches in diameter.
Color: Rind, green, thick, may or may not be powdered with white bloom; flesh, white with white pithy center.
Seed: Small, light straw or buff color.

The Chinese preserving melon is an oriental cucurbit which grows very large, varying in weight from 30 to 40 pounds. The outstanding feature of the melon is its wonderful keeping quality when fully

FIGURE 30.—Cowpeas

matured. It will remain sound for 6 to 12 months if it is not injured. The melon is retailed by the pound, any quantity desired being cut off when purchased. Like other cucurbitaceous vegetables, the Chinese preserving melon is also placed on the market in an immature state, and it is then called Zit-kwa.

To make soup.—Scrape skin from one small, tender melon (1½ to 3 pounds) : cut melon in 1½-inch squares one-half inch thick. Slice thinly one-half pound lean pork and mix with 1 teaspoon cornstarch, a little pepper, and some soy sauce. Have at hand a heated pot containing 1½ teaspoons peanut oil, a little garlic, and one-half

teaspoon salt. Add the pork, stir, and fry for a few minutes. Then add 1½ quarts water. Boil for 15 minutes; add melon and cook until it is tender.

To serve stuffed melon.—Soak 3 tablespoons lotus seeds or lin-ze, and six medium-sized dried mushrooms overnight. Wash lotus seeds and remove the undeveloped green seed leaves (cotyledons) from within. Wash mushrooms and remove stems. Cut 6 ounces bamboo shoots in $\frac{3}{16}$-inch cubes. Scrape melon skin off and discard part of

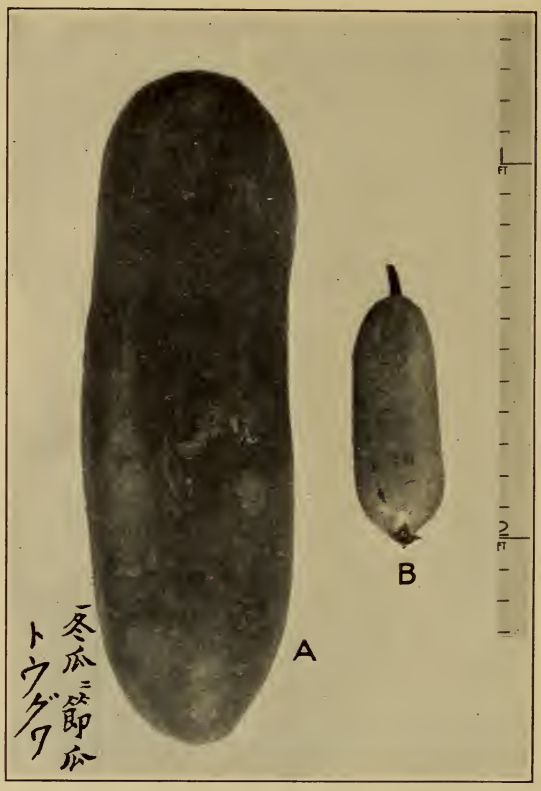

FIGURE 31.—Chinese preserving melon: A, Mature fruit; B, immature fruit

the stem end so that the fruit can be set upright. Open the top and remove the pulp and seeds with a spoon. Chop finely 1 pound pork or duck meat, add 1 teaspoon salt, one-half teaspoon cornstarch, a little pepper, and ginger. Mix with lotus seeds, mushrooms, and bamboo shoots. Stuff the melon with this mixture and place in a pot to steam for one hour. Serve.

To serve sliced.—Cut scraped melon in 2-inch lengths 1½ inches wide and 1 inch thick. Sandwich in each length, by making a slit, a thin slice of medium-lean ham. Add salt to taste and allow to steam in pot for one hour.

DISHCLOTH GOURD (*Luffa acutangula*). (Fig. 32)

Chinese name: See-qua
Japanese name: Hechima

Shape: Long, enlarged at apex, narrow at stem end; slightly curved; ridged longitudinally.
Size: One to two feet long; 1½ to 2½ inches in diameter.
Color: Green skin, white flesh.

FIGURE 32.—Dishcloth gourds

The dishcloth gourd, also known as vegetable gourd, sponge gourd, and rag gourd, somewhat resembles okra (*Hibiscus esculentus*), and is often called Chinese okra. The plant is a monoecious annual and is indigenous to India. The coarse rind of this peculiar gourd bears 10 narrow ridges running lengthwise. Like many other orient-grown melon-bearing vegetables, the gourd must be picked immature for table use. It may be used to replace or supplement edible-podded peas in the chop suey recipe given under the caption, "Edible-Podded Peas," page 39.

To make chop suey.—Use recipe given for edible-podded peas.

To make soup.—Slice thinly one-half pound lean pork. Wash two medium-sized dishcloth gourds, remove ribs and outer skin; slice vegetable crosswise in ½-inch lengths. Have at hand a heated pot containing 1½ teaspoons peanut oil, a little salt, and a small slice ginger. Add the meat and fry for half a minute. Then add a little water and boil for 20 minutes; add the vegetable; cook for 5 minutes; serve.

FIGURE 33.—Long eggplants

LONG EGGPLANT (*Solanum melongena serpentinum*). (Fig. 33)

Chinese name: Ai-kwa
Japanese name: Nanbu-naga nasu

Shape: Club-shaped or clavate.
Size: Four to six inches long; 1 to 1½ inches in diameter.
Color: Purple or white, glossy.

The long eggplant is somewhat of a curiosity. Its diminutive size, shape, and color appeal to a large group of buyers who prefer it to the large variety. In quality the long eggplant is said to be superior to the ordinary round variety.

To prepare for the table.—Bake or fry and serve with soy sauce to which grated ginger has been added.

EDIBLE-PODDED PEAS (*Pisum sativum macrocarpon*). (Fig. 34)

Chinese name: Hoh-lang-dau
Japanese name: Chabo-endo

Shape: Pods, flattened, tapering at both ends, sides somewhat swollen.
Size: Two and a half to three and a half inches in length; one-half to three-fourths inch in diameter.
Color: Light to dark green.

The plant is an annual which grows 2 to 4 feet high. Its native home is western Asia. Edible-podded peas appear on the market as partly developed pods. Both pod and peas are edible. Like bamboo shoots, edible-podded peas are an important ingredient of many attractive oriental dishes.

FIGURE 34.—Edible-podded peas

Edible-podded peas in chop suey.—Soak six medium-sized dried mushrooms in water for one hour and then boil them for 10 minutes. Wash and slice thinly the mushrooms, 6 ounces bamboo shoots, and one medium-sized carrot. Cut in 2-inch lengths two green spring onions, tops and all. Cut one stalk celery into small pieces. Wash 6 ounces edible-podded peas and remove the ends. Slice thinly one-half pound lean pork. Put in heated pot 2 teaspoons peanut oil, one-half teaspoon salt, and a little garlic. Add the meat, bamboo shoots, and carrot. Stir for one-half minute, then add one-half cup water to make gravy. Cook until the vegetables are tender. Remove and place in a side dish. Place in the same heated pot, 2 teaspoons peanut oil, 1 teaspoon salt; then add the edible-podded peas, celery, green onions, and mushrooms. Fry briskly for one-half minute; then add the already cooked mixture from the side dish. Mix the two thoroughly by stirring. Serve hot.

GOA BEANS (*Psophocarpus tetragonolobus*). (Fig. 35)

Chinese name: See-kok-tau

Shape: Pods, square, slightly curved, with distinct thin, green, incised, membranous wings.
Size: Seven to nine inches long; three-fourths to 1¼ inches wide; wings about one-half inch wide.
Color: Dark green.

FIGURE 35.—Goa beans

Although the Goa bean, also known as asparagus pea and winged bean, has been long known and used in the Orient, it has only recently been introduced into Hawaii, where it is as yet little known. Its cultivation promises to be more extensive as it becomes better known. The plant is a native of India (*8, v. 2, p. 211*).

To cook plain.—Prepare like the yard-long bean (p. 44) except that the pods should be cut into ½-inch lengths. The flavor is easily destroyed by overcooking.

JESUITS' NUT (*Trapa bicornis, T. natans*). (Fig. 36)

Chinese name: Ling-kok
Japanese name: Hishi-mo-mi

Shape: Protuberant, triangular; has two strong oppositely placed long decurved horns.
Size: Two and one-half to three inches long from tip to tip of horns; 1 inch wide.
Color: Brown to ebony.

The Jesuits' nut plant, also called " water caltrops," is a floating aquatic annual with spongy, inflated petioles (*7, p. 132*). It is indigenous to the Orient.

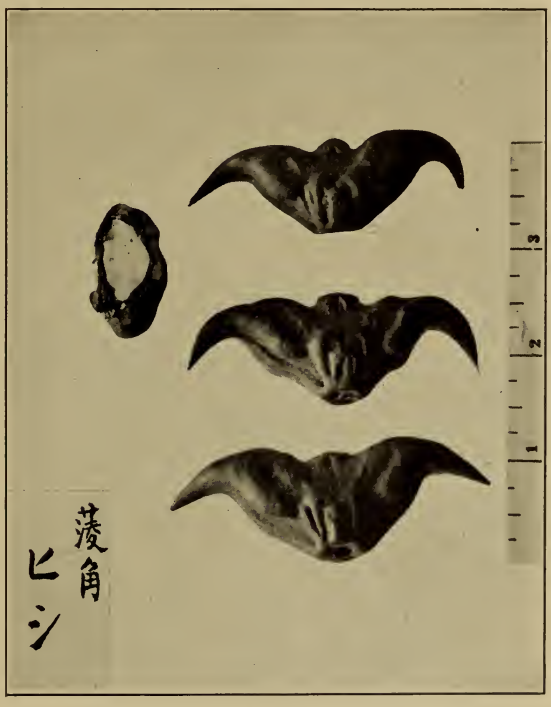

FIGURE 36.—Jesuits' nut

The Jesuits' nut may be found on the markets in late September. Its use, however, is limited to the Full Moon festival of the Chinese. The Jesuits' nut contains a large, white kernel. The nuts are boiled for an hour in hot water. The kernels are then removed and eaten while they are still warm.

ORIENTAL PICKLING MELON (*Cucumis conomon*). (Fig. 37)

Chinese name: Yuet-kwa
Japanese name: Shiro-uri

Shape: Oblong, cylindrical, slightly clavate.
Size: Eight to twelve inches long, 2½ to 3½ inches in diameter.
Color: White to light yellowish green skin and white flesh.

The oriental pickling melon is closely related to the common green cucumber and resembles it in size, shape, and weight, but not in the

color of the skin. The melon is a seasonal vegetable and is found on the market usually in March.

To prepare soup.—Peel melon and cut in halves lengthwise. Remove seeds. Cut the halves crosswise in ½-inch lengths and boil them for about five minutes. Drain; boil again with 2 cups soup stock, 2 tablespoons soy sauce, and one-half teaspoon sugar. Thicken the soup with 1 tablespoon cornstarch before serving. A good soup stock may be made by putting one-half pound grated, dried tuna fish, or katsuobushi, in 1 quart water which is brought to the boiling point. Let stock stand for three minutes, then strain.

FIGURE 37.—Oriental pickling melons

SOYBEANS (*Glycine hispida*). (Fig. 38)

Chinese name: Chang-wong-tau
Japanese name: Daizu

Shape: Pods, narrow, flat, with somewhat convex sides.
Size: Two inches long; one-half inch wide.
Color: Green, very hairy.

The plant is a native of China and Japan. It is a rather unusual Orient-grown vegetable. Unlike the snap bean, green soybeans are sold in their pods attached to the plant. The plants with their pod-laden branches are tied in bunches of 4 to 10. Each plant is

about 15 inches long and has very hairy stems and leaves. The pods also are hairy and are borne in clusters. Each pod contains three to four seeds. The soybean is an all-season crop in Hawaii. It makes its best growth, however, in April. It requires about 75 days from the date of planting to reach the green-pod stage.

To cook plain.—Wash one-half pound fresh soybean pods, and boil until they are soft. Season with soy sauce and sugar, and serve in the pod. The beans are removed from the pods when eaten.

FIGURE 38.—Soybeans

WHITE-FLOWERED GOURD (*Lagenaria vulgaris; L. leucantha*). (Fig. 39)

Chinese name: Woo-lokwa
Japanese name: Yugaho (Ugao)

Shape: Cylindrical; tapering at stem end; has the appearance of a club.
Size: Twelve to eighteen inches long; 2½ to 4 inches in diameter. When mature the gourd often attains a length of 3 to 4 feet and a diameter of 7 to 12 inches.
Color: White to light yellowish green skin covered with fine hairs.

The white-flowered gourd is indigenous to India. Such varieties as the dipper gourd, the sugar-trough gourd, and the Hercules club gourd also belong to this group. The white-flowered gourd is borne

on a musk-scented, hairy vine having ribbed stems and long tendrils. The leaves are large and velvety, 6 to 10 inches long and about as wide. The petiole is cylindrical and 3 to 6 inches long. The seeds are brown, long, and angled.

The white-flowered gourd for market is picked while immature. The fruit becomes coarse and fibrous when it is allowed to remain too long on the vine.

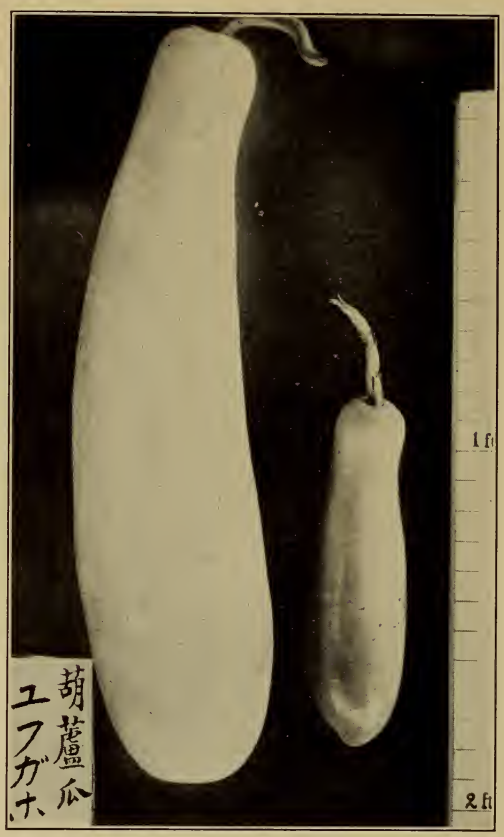

FIGURE 39.—White-flowered gourds

To prepare soup.—Scrape the young, tender gourd and wash. Cut it in 2-inch squares about one-half inch thick. Prepare as directed for making soup from Chinese preserving melon (p. 35).

YARD-LONG BEANS (*Vigna sesquipedalis*). (Fig. 40)

Chinese name: Cheong dau-kok
Japanese name: Juroku-sasage

Shape: Pods, long, slender.
Size: Twelve to thirty-six inches in length; five-sixteenths inch in diameter.
Color: Light yellowish to dark green.

The plant is an annual and is a native of southern Asia. It is also known as asparagus bean, and is closely related to the cowpea but

is readily distinguished from it by greatly elongated pods. The pods for market are picked before they become too coarse or tough. Yard-long beans are packed in bunches of 10 to 20.

To cook with meat.—Break off and discard the ends of 15 yard-long bean pods, wash what remains of the beans well, and cut in 2 to 2½ inch lengths. Slice 1 pound lean beef or pork and mix it with 1 teaspoon cornstarch, 1 teaspoon soy sauce, and a little pepper. Put in heated pot 1½ teaspoons peanut oil, a little ginger and garlic, and 1 teaspoon salt. Add the meat, stir, and fry for about half a minute. Add the beans and stir for another half minute. Then add one-half cup water and cook until the beans are tender.

FIGURE 40.—Yard-long beans

GROUP 3. AQUATIC AND ROOT VEGETABLES

ARROWHEAD (*Sagittaria sagittifolia*). (Fig. 41)

Chinese name: Chee-koo (T'sz-ku)
Japanese name: Kuwai

Shape: Corms, cylindrical or slightly tapering at both ends, or flattened and terminated by an elongated sprout. Two to five lines encircling corm or rootstock.
Size: One to one and one-half inches long; three-fourths to 1½ inches wide.
Color: Gray, bluish-gray, or yellowish skin; light yellow or buff flesh, depending upon the variety.

The arrowhead is a fleshy corm from a stoloniferous perennial having long petioles and leaves of arrowhead shape; hence the name. It grows in marshy or swampy areas. On the island of Oahu arrowhead has escaped cultivation and may be often seen in swamps associated with the bulrushes. Arrowhead is a prolific aquatic plant. A corm when planted will send out eight or more runners as soon as the root system is established. Each of these runners produces a new corm at its end. Arrowhead when cut is yellow-buff, and has the consistency of sweetpotato. Each corm weighs one-half to 1 ounce.

To prepare for the table.—Wash and pare one-half pound arrowhead; cut it in slices about three-sixteenths inch thick. Slice one-half pound lean pork and mix with 1 teaspoon cornstarch, a little pepper, and 1 teaspoon soy sauce. Put in heated pot 1½ teaspoons peanut oil, one-half teaspoon salt, 1 slice ginger; add the pork and

fry. Then add the arrowhead and stir vigorously for one minute. Add just enough water for gravy and cook over a slow fire until the vegetable is tender. Season and serve.

ARROWROOT (*Maranta arundinacea*). (Fig. 42)

Chinese name: Chok-woo

Shape: Fleshy, elongated rhizome with enlarged growing end; tapering toward basal end. Conspicuously crossed by encircling lines.
Size: Four to eight inches long; 1 to 1¼ inches at the thick end.
Color: Ivory skin; white flesh.

Arrowroot is a perennial of South American origin and grows 2 to 3 feet high. The rhizome is very smooth, more or less covered with dry, scaly leaves at the time of harvest. Gardeners usually grow arrowroot for the production of starch for home consumption.

FIGURE 41.—Arrowhead corms

It is seldom found on the market because the demand for it is limited. Only young arrowroot which is not suitable for starch extraction finds its way to the market. The roots or rhizomes are washed and then boiled in salted water until they are tender. Arrowroot is prepared for the table like the sweetpotato.

CHINESE TARO (*Colocasia esculenta*). (Fig. 43)

Chinese name: Bun-long-woo

Shape: Corms, cylindrical, more or less tapering at basal end.
Size: Four to twelve inches in length; 3 to 6 inches in diameter; weight, 1 to 12 pounds.
Color: Skin, brown to gray, coarse, with or without dark, loose fiber. Flesh, white, with conspicuous coarse fiber distributed through interior of corm.

The Chinese taro is like the common Hawaiian varieties in shape, color, and texture. It is, however, much larger and possesses a dis-

FIGURE 42.—Arrowroot

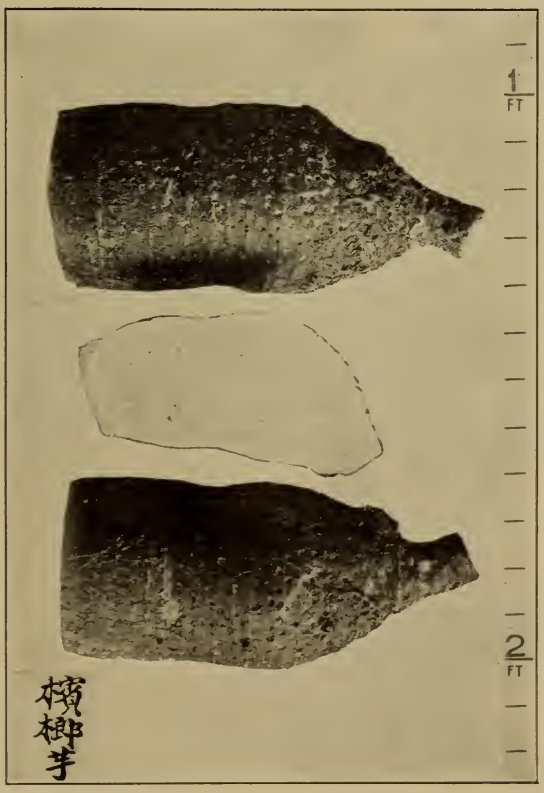

FIGURE 43.—Chinese taro

tinct aroma when cooked. The individual corm from which the leafstalk has been closely severed is marketed.

To serve with meat.—Peel one medium-sized taro root; wash and cut it in 2-inch squares. Slice 1 pound corned pork or ham. Put in heated pot 2 teaspoons peanut oil, a little onion, and the meat. Stir mixture and fry for one-half minute; then add 1 teaspoon soy sauce. Add taro and enough water to cover. Cook until taro is thoroughly done.

To use in steamed pudding.—Prepare taro as directed above. Cook until tender in water to which a little salt has been added. When cool slice it thinly. Chop finely 1 pound of lean pork and mix with 1 teaspoon cornstarch, a little pepper, and soy sauce. Chop finely a little ham or bacon. Wash and chop finely a handful of dried shrimp meat. Put in heated pot 2 teaspoons peanut oil, 1 teaspoon salt, and a little onion. Add the pork, shrimp, and ham, and fry until brown. Make a batter of flour, a little salt, and some water. Mix the taro and the cooked ingredients into the batter. Pour mixture in greased pans and steam until done.

Garlic (*Allium sativum*)

Chinese name: Shin-tau
Japanese name: Nin-niku

Shape: Bulbs, circular with flattened end and raised tip; ridged or ribbed and covered with thin silky skin.
Size: One and one-half to two inches in diameter; one-half to 2½ inches in length.
Odor: Strong; penetrating.

Garlic is a segmented bulb resembling in some respects an onion, but is smaller and longitudinally ribbed. The bulblet when removed from the mass is angular and inclosed in a thin, silky pink or white skin. The fleshy portion is white and about 1 to 1½ inches long.

Garlic is not grown commercially in Hawaii, but is imported from the mainland and the Orient. Two distinct sizes are frequently seen. The larger size comes from California, and the smaller from China. This condiment, like ginger, is largely used in oriental cookery. The addition of a little chopped garlic and hot peanut oil to vegetables imparts to them a pleasant flavor when cooked. Garlic is probably a native of southern China.

Ginger (*Zingiber officinale*). (Fig. 44)

Chinese name: Keong
Japanese name: Shoga

Shape: Rootstock, irregular, enlarged, flattened out, clustered.
Size: Four to twelve inches long; 1½ to 2 inches thick.
Color: Yellow to light-gray skin; cream to yellow flesh.
Odor: Aromatic; characteristic of ginger.

Ginger is a condiment which is marketed in two forms, one with the leafstalks attached and the other with the leafstalks removed. The former is harvested at five months while immature and is in great demand by the Japanese. It is sold in small bunches containing two to four "hands" and is bright canary yellow. The latter form is the rootstock which has been permitted to grow to maturity,

at which time the top growth withers. The matured ginger, both island grown and imported, is generally marketed in large, woven bamboo baskets. Ginger is a favorite ingredient in many oriental dishes. When frying is done, place a slice or two of ginger about one-eighth inch thick in the pan. Add garlic also if desired.

In the Hawaiian Islands considerable ginger is grown for local consumption. The islands of Maui, Hawaii, and Oahu occasionally produce it in sufficient quantities for export to the mainland.

FIGURE 44.—Ginger

Locally and on the mainland the fresh roots are used in the manufacture of ginger ale. The crop matures at seven months. It is usually harvested in May.

GREAT BURDOCK (*Arctium lappa, Lappa major, L. edulis*). (Fig. 45)

Chinese name: Ngau-pong
Japanese name: Gobo

Shape: Root, long, cylindrical, tapering at end.
Size: One to four feet long; one-fourth to 1½ inches thick.
Color: Skin, brown to gray; flesh, white.
Texture: Coarse and fibrous.

Great burdock is normally a biennial with large, broad, cordate leaves, and long petioles, but it is grown as an annual. It is a native

of Europe and Asia. Great burdock is found on the market in two forms. In one form the young roots are sold with the entire foliage attached and in the other form the large roots are sold with the foliage detached. The former is usually the result of thinning the cultivated stand and the latter is the fully grown root. Both forms for market are tied in bundles and have moistened soil adhering to the roots. The burdock-growing section on Oahu is largely confined to the head of the Manoa, Pauoa, and Palolo Valleys. The growing period for the matured root is 10 months, although immature plants

FIGURE 45.—Great burdock

are harvested about 50 days after planting when it is desired to thin the stand.

To serve as flavored gobo (*burdock*).—Scrape roots of four medium-sized burdocks well; cut them in 2-inch lengths. Soak them in water for two hours; then boil until they are soft; drain. Place on meat block or chopping board and pound each piece lightly several times (avoid smashing); then place them on plates. Wash 1 tablespoon of sesame and toast it slightly in frying pan; then place while warm in mortar and grind fine. Add 1 tablespoon soy sauce, 2 tablespoons sugar, mix, and pour over the plate of boiled gobo (burdock roots); serve.

JAPANESE TARO (*Colocasia esculenta*). (Fig. 46)

Chinese name: Woo-chai
Japanese name: Ko-imo

Shape: Corms, vary from round to oblong.
Size: Two to three inches long; 1½ to 2 inches in diameter.
Color: Skin, coarse, dark gray or gray with traces of purple with loose dark or gray fiber; flesh, white or pink (*7, p. 455.*)

Ko-imo is the general name applied to three or more varieties of Japanese taro belonging to the dasheen group. Ko-imo means

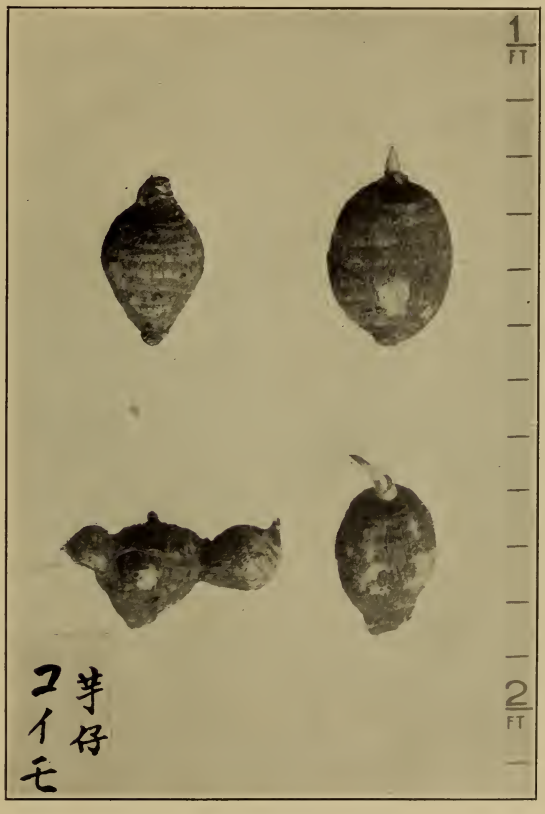

FIGURE 46.—Japanese taro

"small tuber," and refers especially to the young cormels of the Miyako, Aka-do, and Tru-no-ko varieties, which are extensively grown in Hawaii. The varieties are either white or pink-fleshed. Usually the corms, or oya-imo, and the cormels of the pink variety are edible, the corms of the white variety are edible but not palatable, and only the cormels of the white variety are preferred.

The Japanese vegetable vendors usually keep a supply of pared or scraped taros for the convenience of regular purchasers. These taros may be found submerged in water in a container and should not be mistaken for some other vegetable.

To cook plain.—Peel and wash 1 pound Japanese taro, cut in convenient sizes, and boil for seven minutes. Drain; and boil again with 3 tablespoons soy sauce and 1 tablespoon sugar until thoroughly cooked.

KUDZU (*Pueraria thunbergiana, P. hirsuta, Dolichos japonica*). (Fig. 47)

Chinese name: Fan-kot
Japanese name: Kudzu

Shape: Root, large; tapering, or irregular.
Size: Five to twenty-four inches in length; 3 to 18 inches in diameter.
Color: Straw-colored to light-brown skin; white flesh.

FIGURE 47.—Kudzu

The kudzu root resembles somewhat the sweetpotato in general conformation, but has very coarse, tough skin, and fibrous flesh. Some of the roots grow to great size, but only the smaller roots are used for the table. Choice starch can be extracted from the kudzu root. The plant is a hairy, twining perennial which grows 30 to 60 feet long. It is sold by seedsmen as an arbor plant. It is a native of China and Japan.

LOTUS ROOT (*Nelumbium nelumbo*). (Fig. 48)

Chinese name: Lin-ngau
Japanese name: Hasu-no-ne

Shape: Root divided into segments resembling links of sausage; individual links oblong.
Size: Two to four feet in length, 2½ to 3½ inches in diameter; individual segment or link 3 to 6 inches long.
Color: White to buff orange throughout.
Interior: Cross section of segment is perforated with 10 canals of two sizes, the smaller alternating with the larger.

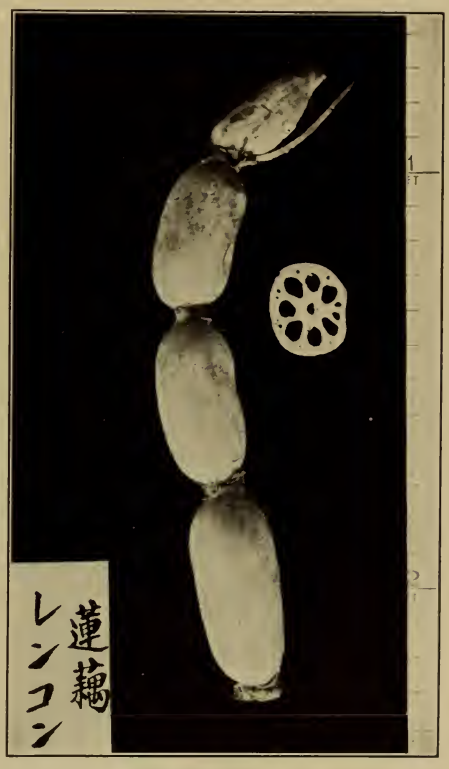

FIGURE 48.—Lotus root

Lotus root is one of the unique vegetables of the Orient and is not closely related to any other vegetable. It is a productive aquatic crop and is in great demand. Large quantities of the roots are shipped to the United States to supply the demand of the oriental population from San Francisco to New York City. In Hawaii the lotus root is harvested from July to November. Parts of the root are allowed to remain ungathered at the last harvest to send forth new plants about the following February. The lotus root is also known as "the sacred lotus" and is indigenous to China, India, and Persia.

To prepare for soup.—Cut off and discard the ends of each joint of two medium-sized lotus roots; wash and scrape. Cut the roots lengthwise into halves; then slice crosswise in ½-inch lengths and wash again. Slice thinly 1 pound lean pork and mix with 1 teaspoon cornstarch, 2 teaspoons soy sauce, and a little pepper. Boil 1 quart water and add 1 teaspoon salt, the pork mixture, and the lotus, and cook over a slow fire until tender.

To serve with beef or pork.—Prepare in the same way as directed for yard-long bean (p. 44), but quarter the lotus lengthwise and slice thinly.

ORIENTAL RADISH (*Raphanus sativus longipinnatus*). (Fig. 49A)

Chinese name: Loh-bak choi
Japanese name: Daikon

Shape: Roots, spherical, oblong, cylindrical.
Size: Three to twenty-four inches in length; 2 to 6 inches in diameter.
Color: White.

The radish, commonly known as oriental radish, is a native of China and Japan, and is the most conspicuous root vegetable[8] on the

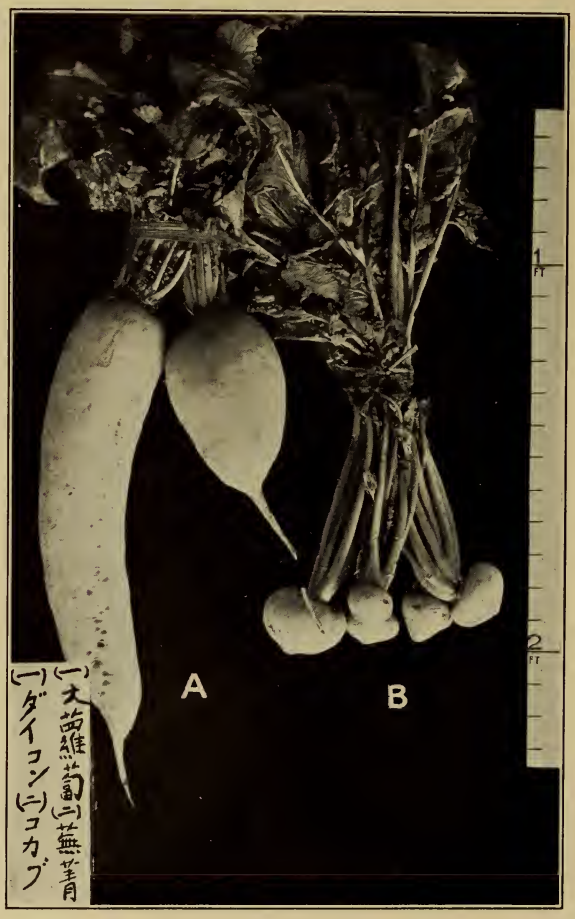

FIGURE 49.—Oriental radishes: A, Japanese radishes or daikon; B, turnips

market. It is in season throughout the year. Three distinct types or varieties—spherical, oblong, and cylindrical—are grown locally. The oblong variety, which does not exceed 4 inches in length and about 2 inches in width, is preferred by the Chinese; whereas the large, long, and round roots are preferred by the Japanese. The

[8] Botanically, the portion of the radish designated by common usage as "root" is the lower part of the stem with the taproot.

small variety is marketed in bunches of 4 to 6 roots, and the larger variety in bunches of 1 to 4, depending upon size of each root.

To cook with miso sauce (Japanese style).—Peel and slice root crosswise in 1-inch lengths; wash roots and boil until they are tender. Add miso sauce while they are still hot. The miso sauce is prepared by grinding miso in a bowl and adding grated ginger, soup stock, and sugar gradually, mixing thoroughly. The Chinese prepare the oriental radish by peeling, washing, and slicing thinly as directed for arrowhead.

TURNIP (*Brassica rapa*). (Fig. 49B)

Chinese name: Mu-ching
Japanese name: Kabura

Shape: Root, flattened to globular.
Size: One and three-fourths to two and one-fourth inches high; 2 to 3 inches in diameter.
Color: White or traced with purple.

The turnip is somewhat like the Japanese radish in appearance, and bears only a few thin rootlets on the slender taproot. Very often turnips for market are sold in bunches from which the taproots have been trimmed off. The leaves are narrow, 8 to 12 inches long, soft, and somewhat pubescent. The young turnips with tops attached are marketed also as greens. The turnip is prepared for the table like Japanese radish and arrowhead.

WATER CHESTNUT (*Scirpus tuberosus*). (Fig. 50)

Chinese name: Ma-tai
Japanese name: Kuro-Kuwai

Shape: Corms, spherical or globular with flattened base and rounded top; firm and turgid.
Size: Seven-eighths to one inch by 1¼ to 1½ inches in diameter.
Color: Dull to glossy brown or ebony skin; white flesh.
Taste: Flat, starchy.

Water chestnuts are seasonal roots which are found on the local markets from about July until late September. They usually are kept in mat-woven bags or bamboo baskets alongside vegetable stands. Water chestnuts are also imported into Hawaii from China. These are like the locally grown product except that they are sweet, and partly wrinkled from the loss of moisture. The water chestnut is a favorite ingredient in numerous Chinese dishes (*4, p. 15*). The chestnuts are pared, and sliced thinly and mixed with sliced bamboo shoots or with edible-podded peas, and the like.

YAM (*Dioscorea batatas*). (Fig. 51)

Chinese name: Tai-sue
Japanese name: Naga-imo

Shape: Roots, cylindrical, oblong, straight, or irregular.
Size: Six to eighteen inches in length; 2 to 6 inches in diameter.
Color: Skin gray to dark without and purple within; flesh white.

The yam, also known as "Chinese yam," "Chinese potato," and "cinnamon-vine," is commonly grown by the oriental farmers. It is

FIGURE 50.—Water chestnuts

FIGURE 51.—Yams

an enlarged rootstock which somewhat resembles the sweetpotato in general appearance.

To cook plain.—Peel and wash. Slice in 2-inch squares one-fourth inch thick, and prepare as directed for arrowhead.

YAM BEAN ROOT (*Pachyrhizus erosus, P. tuberosus, P. angulatus*). (Fig. 52)

Chinese name: Sar-gott

FIGURE 52.—Yam bean roots

Shape: Root turnip shaped, flattened, or elongated.
Size: Four to six inches long; 3 to 4½ inches across.
Color: Skin, straw yellow; flesh, white.

The yam bean root is like the turnip in shape, has a rather tough skin with the texture and the color of the kudzu, and in consistency resembles the white potato. The flesh is sweet and of pleasant flavor.

To cook plain.—Cut and discard the ends and rip off the skin. Wash and quarter; then slice thinly crosswise. Prepare as directed for arrowhead.

COMPOSITION

Although the composition of a few of the more common vegetables of oriental origin has been determined, the food value of many is still unknown. In view of the fact that these vegetables form

the basis of the dietary of a large part of the inhabitants of Hawaii, it is desirable that their chemical composition be known. A previous publication of the station (*11*) pointed out the desirability of using more locally grown vegetables in the diet. Chemical analyses at the station of 56 different fresh vegetables of oriental origin show that they are as rich in all the necessary food and mineral constituents as are vegetables grown on the mainland of the United States. Although such factors as vitamin content, digestibility, and quality of protein have not as yet been determined, it is probably safe to assume that, in a general way, the various groups of vegetables of oriental origin are equivalent in these respects to similar groups of the better-known vegetables for which these factors have been determined.

EXPERIMENTAL METHODS

The nutritive constituents were determined by methods outlined by the Association of Official Agricultural Chemists (*2*). Of the ash constituents, calcium was determined volumetrically by the method outlined by Patten (*10*). Phosphorus was estimated volumetrically by the usual method. In the determination of iron, a comparatively large sample, at least 10 grams, was ashed and the ash digested in the water bath with dilute sulphuric acid for several hours, or until solution occurred. Reduction was effected by means of a Jones reductor, and the iron was titrated with 0.02 N potassium permanganate. Alkalinity of ash was determined by dissolving the ash in a measured excess of 0.1 N hydrochloric acid, warming the solution sufficiently to expel the carbonic acid, and titrating the excess acid.

Analyses were made of vegetables grown in the vicinity of Honolulu, and procured fresh either from markets or from near-by truck farms. The sample used in each instance varied from 1 to 3 pounds. Analysis was made of the edible portion only. In most instances, however, the entire vegetable as purchased was edible.

LEAFY AND STEM VEGETABLES

This group of vegetables varies from those with thin, green leaves and small stems or petioles, to those with thick, succulent, and often white leaves and a relatively large proportion of thick fleshy stems, or sometimes no leaves at all. It is generally true that the thin, green-leaf types are much richer in the different constituents than are the white-leaf or fleshy-stem types. The former, however, are often characterized by a more pronounced, somewhat astringent taste, for which reason they are usually discarded in favor of the milder-flavored, fleshy-stem, and blanched-leaf sorts. In general, the leafy and stem vegetables are characterized by high water content, correspondingly low energy value, and high content of all the minerals, particularly of calcium and iron. They are the best source of the antiscorbutic vitamin C, and in many instances a good source of vitamins A and B. Because of their succulence, the vegetables of this group add materially to the bulk of the meal. By reason of their low energy value, they may be used in small or large quantities without materially altering the desired intake of carbohydrates and proteins. This group is valuable in the forma-

tion of balanced dietaries with respect to mineral constituents and vitamins.

Table 1 gives the nutritive constituents and mineral elements of 30 leafy and stem vegetables grown in the vicinity of Honolulu.

TABLE 1.—*Percentage composition (nutritive constituents and mineral elements) and ash alkalinity of 30 leafy and stem vegetables grown in the vicinity of Honolulu*

Sample No.	Kind of material	Moisture	Nutritive constituents					Mineral elements			Alkalinity [1]
			Protein (N×6.25)	Fat (ether extract)	Carbohydrates		Ash	Calcium (Ca)	Phosphorus (P)	Iron (Fe)	
					Nitrogen-free extract	Crude fiber					
1	Bamboo shoots [2]	93.08	1.84	0.13	3.17	1.01	0.77	0.005	0.044	0.0007	7.7
2	Bean sprout (large)	82.40	7.62	1.07	6.71	.86	1.34	.029	.023	.0026	16.4
3	Bean sprout (small)	93.77	2.52	.08	2.98	.34	.31	.007	.038	.0007	4.0
4	Butterbur	92.70	.39	.04	4.11	1.30	1.46	.103	.012	.0038	14.3
	Cabbage:										
5	Chinese, heading	96.04	1.58	.05	1.61	.50	.66	.037	.057	.0008	6.0
6	Chinese, nonheading	94.63	1.20	.09	2.14	.73	1.21	.102	.051	.0047	7.9
7	Chinese, leaf-mustard	94.22	1.99	.07	1.90	.65	1.17	.084	.046	.0035	12.2
8	Potherb mustard	95.24	1.53	.06	1.51	.65	1.01	.070	.038	.0031	11.2
9	White mustard, flowering	93.68	2.07	.14	1.94	.85	1.31	.109	.062	.0031	10.7
10	Japanese white mustard	95.62	1.55	.06	1.21	.46	1.10	.121	.037	.0018	13.9
11	White mustard, stout	95.12	1.37	.08	1.72	.47	1.24	.096	.025	.0022	9.9
12	Swamp	92.26	1.94	.14	3.31	1.13	1.22	.077	.064	.0032	14.3
13	Chives	91.22	2.60	.33	3.09	1.48	1.28	.048	.057	.0084	12.6
14	Dandelion greens [3]	------	2.40	1.00	10.60	------	------	.105	.072	.0027	------
15	Garland chrysanthemum	94.01	1.78	.12	2.02	.76	1.31	.040	.045	.0036	13.2
	Greens:										
16	Radish	93.54	1.77	.09	2.25	.90	1.45	.116	.038	.0036	14.9
17	Turnip	91.62	1.81	.11	3.22	1.35	1.89	.227	.069	.0028	17.1
18	Honewort	89.53	2.33	.23	4.37	1.45	2.09	.114	.061	.0149	23.9
19	Kale	91.24	2.82	.21	2.94	1.05	1.74	.195	.060	.0035	17.7
20	Lettuce	95.94	.97	.11	1.56	.58	.84	.028	.022	.0030	6.8
21	Malabar nightshade	94.92	1.37	.14	1.75	.58	1.24	.030	.057	.0040	18.7
22	Matrimony-vine [4]	84.60	4.55	.46	5.89	1.31	3.19	.315	.048	.0299	48.2
	Spinach:										
23	Chinese	92.30	1.68	.12	3.22	.99	1.69	.102	.035	.0066	27.0
24	Common	93.40	2.12	.08	2.27	.63	1.50	.055	.043	.0212	22.7
25	Swiss chard	92.17	1.45	.18	3.09	.87	2.24	.100	.024	.0043	24.6
26	Taro shoots	95.39	.92	.09	2.17	.58	.85	.013	.030	.0017	10.5
27	Taro stalks	93.20	.79	.13	3.52	1.44	.92	.066	.032	.0101	13.6
28	Tender fern fronds	91.28	1.02	.08	5.59	1.45	.58	.008	.017	.0015	5.5
29	Water cress	94.86	2.00	.11	1.28	.64	1.11	.085	.053	.0022	11.7
30	Water dropwort	92.76	1.59	.11	3.14	1.07	1.33	.060	.067	.0058	11.0

[1] Expressed as cubic centimeters of normal acid solution required to neutralize excess of base per 100 grams of fresh vegetable.
[2] Outer sheaths removed.
[3] *12, pp. 414, 423.*
[4] Leaves only.

Although the group as a whole is comparatively rich in calcium, the bamboo shoots, small bean sprouts, taro shoots, and tender fern fronds, all of which may be termed "immature stems," are decidedly low in this element. Large bean sprouts show a decidedly different composition from that of other members of the group, being exceptionally high in protein, fat, and carbohydrates. The cotyledons are relatively large as compared with the sprout, which fact accounts for the high protein and energy value. The cabbage samples, Nos. 5 to 12, inclusive, are characterized by high water content and comparatively low protein and energy value. With the exception

of heading Chinese cabbage, the cabbages are rich sources of calcium. The superiority of the green-leaf, nonheading Chinese cabbage over the blanched, heading variety is marked. Both radish and turnip greens stand out as rich sources of calcium. This is also true of kale. Of the spinaches, the Chinese variety is superior in calcium but inferior in iron. Both have a decided excess of basic elements. Two vegetables of the group, honewort and matrimony-vine, would seem to deserve a more important rank among the oriental vegetables than they now have. These vegetables contain appreciable amounts of protein and energy. They are also rich in the different mineral constituents. Matrimony-vine particularly is outstanding. It contains nearly twice as much of the mineral constituents, except phosphorus, as does any other vegetable in the group.

FRUIT AND POD VEGETABLES

This group is divided into two types, the fleshy vegetables and the pod vegetables. The fleshy vegetables are generally characterized by high water content and low protein and energy value. They are among the poorest in mineral value and are chiefly valued for their succulence. The fresh-pod vegetables are important sources of protein and to a less extent of energy. Table 2 gives the nutritive constituents and mineral elements of the more important oriental fleshy and pod vegetables in Hawaii.

TABLE 2.—*Percentage composition (nutritive constituents and mineral elements) and ash alkalinity of seven fleshy and five pod vegetables grown in the vicinity of Honolulu*

Sample No.	Kind of material	Moisture	Nutritive constituents					Mineral elements			Alkalinity [1]
			Protein (N×6.25)	Fat (ether extract)	Carbohydrates: Nitrogen-free extract	Carbohydrates: Crude fiber	Ash	Calcium (Ca)	Phosphorus (P)	Iron (Fe)	
	Fleshy vegetables:										
31	Balsam-pear	89.20	1.49	0.12	5.71	1.68	1.80	0.022	0.107	0.0024	22.90
	Gourd—										
32	Dishcloth	95.91	.77	.05	2.22	.63	.42	.005	.020	------	3.80
33	White flowered	94.96	.63	.04	3.38	.56	.43	.007	.020	.0008	5.20
34	Eggplant, dwarf	93.37	1.14	.05	4.05	.85	.54	.010	.034	.0017	6.30
	Melon—										
35	Chinese preserving, immature	95.80	.47	.02	2.69	.56	.45	.011	.025	.0006	5.30
36	Chinese preserving, mature	96.20	.40	.03	2.24	.68	.45	.015	.021	.0024	5.30
37	Oriental, pickling	96.82	.47	.02	1.81	.57	.31	.006	.006	.0006	3.80
	Pod vegetables:										
	Beans—										
38	Goa [2]	91.56	2.26	.02	4.07	1.39	.70	.063	.048	------	8.40
39	Soy [3]	70.86	12.71	2.16	11.36	1.33	1.58	.047	.189	.0047	16.70
40	Yard-long [2]	90.64	2.94	.15	4.11	1.42	.74	.057	.051	------	10.70
41	Cowpeas	89.18	2.97	.08	5.86	1.22	.69	.037	.052	.0049	10.40
42	Peas, edible-podded	88.66	3.33	.10	6.10	1.06	.75	.043	.062	.0032	8.20

[1] Expressed as cubic centimeters of normal acid solution required to neutralize excess of base per 100 grams of fresh vegetable.
[2] Pods included in sample.
[3] Pods removed.

Balsam-pear differs from the rest of the fleshy group in mineral composition. It is exceptionally rich in phosphorus and base-forming elements. The others are uniformly low in the various constituents. Of the pod vegetables, the soybean is markedly superior, being exceptionally high in protein, fat, carbohydrate, and phosphorus, with good quantities of the other constituents. The fact that the quality of the protein in the soybean is higher than in any other known vegetable adds to its importance as a source of this constituent in the oriental dietary. The other members of the group are similar in their composition. Though not outstanding in any particular these vegetables are well balanced in all food constituents.

AQUATIC AND ROOT VEGETABLES

The aquatic and starchy root vegetables serve primarily as sources of carbohydrates. Since a large proportion of the constituents required to maintain the body consists of carbohydrates, some of the vegetables of this group usually form the basis of the average dietary. The nonstarchy roots differ radically from the starchy group, and are unimportant as sources of energy. Their carbohydrate content is as low as that of the most succulent leafy vegetables. They function chiefly in providing bulk to aid digestion.

The aquatic vegetables are not as high in carbohydrates as are most of the starchy roots, but they are comparatively high in protein. Very poor in calcium, they are generally rich sources of phosphorus.

Table 3 gives the nutritive constituents and mineral elements of the aquatic and root vegetables of oriental origin.

TABLE 3.—*Percentage composition (nutritive constituents and mineral elements) and ash alkalinity of 4 aquatic and 10 root vegetables grown in the vicinity of Honolulu*

Sample No.	Kind of material	Moisture	Nutritive constituents					Mineral elements			Alkalinity [1]
			Protein (N×6.25)	Fat (other extract)	Carbohydrates		Ash	Calcium (Ca)	Phosphorus (P)	Iron (Fe)	
					Nitrogen-free extract	Crude fiber					
	Aquatics:										
43	Arrowhead	76.46	4.71	0.37	16.12	0.67	1.67	0.016	0.207	0.0049	16.20
44	Jesuits' nut [2]	80.00	3.49	.02	15.33	.36	.80	.016	.128	.0020	------
45	Lotus root	83.20	2.35	.08	12.35	.69	1.33	.025	.086	.0027	9.00
46	Water chestnut [2]	79.54	5.89	.04	13.07	.55	.91	.002	.065	.0018	6.40
	Starchy roots:										
47	Arrowroot [3]	63.40	1.60	.20	30.00	3.90	.90	------	------	------	------
48	Great burdock	60.62	1.09	.07	33.37	3.78	1.07	.064	.039	.0039	17.60
49	Kudzu [2]	68.56	2.13	.05	27.08	.73	1.45	.066	.069	.0019	19.60
	Taro—										
50	Chinese [2]	72.37	1.48	.11	24.23	.61	1.20	.023	.069	.0017	14.50
51	Japanese	81.40	1.44	.07	15.34	.63	1.12	.013	.032	.0015	15.40
52	Yam	78.23	1.11	.12	18.60	.96	.98	.008	.041	.0074	10.70
53	Yam bean root	87.34	.94	.03	10.87	.47	.35	.009	.020	.0019	4.40
	Nonstarchy roots:										
	Radish—										
54	Chinese	95.04	1.08	.03	2.39	.65	.81	.021	.026	.0006	9.60
55	Japanese	94.85	.87	.03	3.03	.64	.58	.023	.019	.0005	4.50
56	Turnip	93.74	1.40	.05	3.20	.66	.95	.039	.048	.0010	10.20

[1] Expressed as cubic centimeters of normal acid solution required to neutralize excess of base per 100 grams of fresh vegetable.
[2] Peeled.
[3] (*6, p. 145.*)

Of the starchy vegetables, the arrowroot and the great burdock are the highest in starch content, but they are limited in their usage. Of those more commonly used, the kudzu and the Chinese taro appear to be the most desirable as sources of carbohydrates. While the vegetables of this group are not high in mineral constituents, the fact that they appear on the table nearly every day in the year makes them of importance, particularly with respect to alkalinity of ash. The three nonstarchy root vegetables appear to be somewhat alike in dietary value.

CLASSIFIED LIST OF VEGETABLES

LEAFY AND STEM VEGETABLES

Common name	Scientific name	Chinese name	Japanese name	Page
Bamboo shoots	*Bambusa* spp	Choke-sun	Take-noko	2
Bean sprouts (soy), large	*Glycine hispida*	Dai-tau-nga		3
Bean sprouts (mungo), small.	*Phaseolus aureus*	Nga-choi	Moyashi-mame	4
Butterbur	*Petasites japonica*	Foon-dung	Fuki	4
Celery	*Apium graveolens*	Hon-kun	Oranda-mitsuba	5
Chinese cabbage	*Brassica pe-tsai, B. pekinensis.*	Wong-nga-bak	Shanto-na	7
Chinese spinach	*Amaranthus gangeticus*	Yin-choi	Hiu (Hiyu)	7
Chives	*Allium schœnoprasum*	Kui-choi	Nira	9
Coriander	*Coriandrum sativum*	Yuen-sai	Koyendoro	9
Dandelion	*Taraxacum officinale*	Pu-kung-ying	Tampopo (Tanpopo)	9
Garland chrysanthemum	*Chrysanthemum coronarium.*	Tung-ho-choi	Shin-giku	11
Ginger bracts	*Zingiber mioga*	Keong-fa	Mioga	12
Green onion	*Allium fistulosum*	Chang-chung	Negi	12
Honewort	*Cryptotænia canadensis*	Asp-ye-kan	Mitsuba	13
Kale	*Brassica oleracea acephala.*	Kai-lan-choi		14
Leaf-mustard cabbage	*Brassica juncea*	Kai-choi	Oh-garashi	15
Leek	*Allium porrum*	Dai-chung	O-negi	15
Lettuce	*Lactuca sativa*	Sung-choi	Chisa	17
Malabar nightshade	*Basella rubra*	Pu-tin-choi	Tsuru-murasaki	17
Matrimony-vine	*Lycium chinense*	Kau-kei	Kuko	18
Mugwort	*Artemisia vulgaris*	Ngaai	Yomogi	19
Perilla	*Perilla frutescens*	Che-so	Shiso	20
Potherb-mustard cabbage.	*Sinapis chinensis*	Sui-choi	Midsuna	21
Radish greens	*Raphanus sativus longipinnatus.*	Loh-bak-choi-chai	Ko-ko-no-ka daikon	22
Spinach	*Spinacia oleracea*	Boh-choi	Horenso	22
Swamp cabbage	*Ipomœa reptans*	Ung-choi		24
Swiss chard	*Beta vulgaris cicla*	Tim-choi	To-jisa	25
Taro shoots	*Colocasia esculenta*	Woo-sun	Imo-no-me	26
Taro stalks	*Colocasia esculenta*	Woo-harp	Imo-kuki	27
Tender fern fronds	*Pteridium aquilinum*	Kuet	Warabi	28
Turnip greens	*Brassica rapa*	Mu-ching-choi-chai	Ko-ko-no-ka kubura	29
Water cress	*Nasturtium officinale*	Sai-yong-choi	Kawara-chisa	29
Water dropwort	*Œnanthe stolonifera*	Sui-kan	Seri	30
White-mustard cabbage	*Brassica chinensis*	Bak-choi	Shirona	31

FRUIT AND POD VEGETABLES

Balsam-pear	*Momordica charantia*	Fu-qua	Tsuru-reishi	33
Cowpeas	*Vigna sinensis*	Sai dau-kok	Sasage	34
Chinese preserving melon	*Benincasa cerifera*	Dung-kwa	Togwa	35
Dishcloth gourd	*Luffa acutangula*	See-qua	Hechima	37
Long eggplant	*Solanum melongena serpentinum.*	Ai-kwa	Nanbu-naga nasu	38
Edible-podded peas	*Pisum sativum macrocarpon.*	Hoh-lang-dau	Chabo-endo	39
Goa beans	*Psophocarpus tetragonolobus.*	See-kok-tau		40
Jesuits' nut	*Trapa bicornis, T. natans*	Ling-kok	Hishi-mo-mi	41
Oriental pickling melon	*Cucumis conomon*	Yuet-kwa	Shiro-uri	41
Soybeans	*Glycine hispida*	Chang-wong-tau	Daizu	42
White-flowered gourd	*Lagenaria vulgaris, L. leucantha.*	Woo-lokwa	Yugaho (Ugao)	43
Yard-long beans	*Vigna sesquipedalis*	Cheong dau-kok	Juroku-sasage	44

ROOT AND AQUATIC VEGETABLES

Common name	Scientific name	Chinese name	Japanese name	Page
Arrowhead	*Sagittaria sagittifolia*	Chee-koo (T'sz-ku)	Kuwai	45
Arrowroot	*Maranta arundinacea*	Chok-woo		46
Chinese taro	*Colocasia esculenta*	Bun-long-woo		46
Garlic	*Allium sativum*	Shin-tau	Nin-niku	48
Ginger	*Zingiber officinale*	Keong	Shoga	48
Great burdock	*Arctium lappa, Lappa major, L. edulis.*	Ngau-pong	Gobo	49
Japanese taro	*Colocasia esculenta*	Woo-chai	Ko-imo	51
Kudzu	*Pueraria thunbergiana, P. hirsuta, Dolichos japonica.*	Fan-kot	Kudzu	52
Lotus root	*Nelumbium nelumbo*	Lin-ngau	Hasu-no-ne	53
Oriental radish	*Raphanus sativus longipinnatus.*	Loh-bak choi	Daikon	54
Turnip	*Brassica rapa*	Mu-ching	Kabura	55
Water chestnut	*Scirpus tuberosus*	Ma-tai	Kuro-kuwai	55
Yam	*Dioscorea batatas*	Tai-sue	Naga-imo	55
Yam bean root	*Pachyrhizus erosus*	Sar-gott		57

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